DOCUMENT RESUME

ED 197 152 CE 027 781

AUTHOR	Leland, Lyle
TITLE	Mountain Plains Learning Experience Guide: Carpentry. Course: Rough-In.
INSTITUTION	Mountain-Plains Education and Economic Development Program, Inc., Glasgow AFB, Mont.
SPONS AGENCY	Office of Vocational and Adult Education (ED), Washington, D.C.
BUREAU NO	498MH90008
PUB DATE	Aug 75
CONTRACT	300-79-0153
NOTE	619p.: Some pages may not reproduce well due to light print. For related documents, see CE 027 766 and CE 027 782.
EDRS PRICE	MF03/PC25 Plus Postage.
DESCRIPTORS	Adult Education: Building Trades: *Carpenters: Ceilings: *Construction (Process): Disadvantaged: Family Programs: *Flooring: *Individualized Instruction: Instructional Materials: Learning Activities: Learning Modules: Postsecondary Education: *Roofing: Site Development: Skilled Occupations: *Vocational Education: Woodworking
IDENTIFIERS	Mountain Plains Program

ABSTRACT

One of two individualized courses included in a carpentry curriculum, this course includes those skills and knowledge related to and included in the carpentry tasks of structure framing and forming. The course is comprised of four units: (1) Excavation Layout--Concrete and Forms, (2) Floor and Wall Framing, (3) Ceiling Framing, and (4) Roof. Each unit begins with a Unit Learning Experience Guide that gives directions for unit completion. The remainder of each unit consists of Learning Activity Packages (LAP) that provide specific information for completion of a learning activity. Each LAP is comprised of the following parts: objective, evaluation procedure, resources, procedure, supplemental sheets, study guide, and a LAP test with answers. The course is preceded by a pretest which is designed to direct the student to units and performance activities. (LRA)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED197152

MOUNTAIN PLAINS LEARNING EXPERIENCE GUIDE:

Carpentry.

Course: Rough-In.

CE027781

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

File Code: 70.01.00.00.A2-1

Date Published: 8/14/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Experience Guide

COURSE: ROUGH-IN

DESCRIPTION:

The Rough-In course is designed to provide information, procedures and experiences used by the carpenter. This course includes those skills and knowledge related to and included in the carpentry tasks of structure framing and forming. The framing tasks include the floors, walls, ceiling and roofs. The forming tasks are those for concrete sections.

RATIONALE:

A qualified carpenter is capable of preparing andinstallingthe frame assemblies and forms for various structures. This course provides information and directions for quality structure frame and form assembly. Experience oriented activities provide performance application for the assembly of frame and form section.

OBJECTIVES:

Given a blueprint and specifications, students layout, determine, obtain, prepare, and assembly the materials required to complete the framing and forming requirements for a specified structure.

PREREQUISITES:

The prerequisite for entry into the Rough-In course is a Communication Skill Level of G.

RESOURCES:

A resource list is attached.

GENERAL INSTRUCTIONS:

This course has four units. Each unit has a Unit Learning Experience Guide (LEG) that gives directions for unit completion. Each unit consists of Learning Activity

Principal Author(s): Lyle Leland

Packages (LAPs) that provide specific information for completion of a learning activity. Pretesting results direct the student to units and performance activities.

The general procedure for this course is as follows:

1. Read the assigned unit LEG for this course.
2. Begin and complete the first assigned LAP.
    a. Take and score the LAP test.
    b. Turn in the LAP test answer sheet.
    c. Determine the reason for any missed items on the LAP test.
    d. Proceed to the next assigned LAP in the unit.
    e. Complete all required LAPs for the unit by following Steps (a) through (d).
3. Take the unit tests as described in the Unit LEG "Evaluation Procedures."
4. Proceed to the next assigned unit in this course.
5. Follow Steps 1 through 4 for all required units for this course.
6. Proceed to the next assigned course.

You will work independently unless directed to do otherwise. When questions or problems arise, you are expected to discuss them with the instructor. At all times remember to follow correct safety procedures during the performance activity.

EVALUATION PROCEDURE:

Course evaluation is by pre and post testing using a multiple-choice type of test.

In this course, the course test is used as a pretest to determine which units, if any, the student may be able to validate. The student is considered validated for a particular unit if 4 out of 5 items are correctly answered for each LAP part on the course pretest and that particular unit does not have a performance test requirement.

For those units with performance test requirements, the student must also satisfactorily complete the performance test to validate that unit. Unit performance tests validation procedures are given in the "Evaluation Procedure" section of the unit Learning Experience Guide (LEG).

The course test will also be taken by the student as a post test to determine any changes resulting from taking all or part of the course.

UNIT TITLES:

.01 Excavation Layout-Concrete and Forms
.02 Floor and Wall Framing
.03 Ceiling Framing
.04 Roof

FOLLOW-THROUGH:

After reading their course guide, obtain the unit guide for the first unit that you are assigned. Read that unit guide and proceed as directed.

RESOURCE LIST

Printed Materials

1. Blueprint Reading and Sketching, Carpentry Trades, Residential. Delmar Publishers, 1957.
2. Carpentry. United Brotherhood of Carpenters and Joiners of America, Carpenters Printing Plant, Washington, D.C., 1950-1970.
3. Collection of blueprints.
4. Collection of specification sheets.
5. Concrete Technology. Student Manual, Portland Cement Association in cooperation with the National Ready Mixed Concrete Association, Delmar Publishers, 1965.
6. Modern Carpentry. Willis H. Wagner, Goodheart-Willcox, 1973.
7. The Steel Square. L. Perth, Stanley Tools, 1967.

Audio/Visuals

none

Equipment

1. Bar, flat rip.
2. Bits, twist (set).
3. Cutters, wire side.
4. Drill, electric hand.
5. Edger, concrete.
6. Line, chalk.
7. Line, dry.
8. Liner, concrete.
9. Maul.
10. Planes, block, power.
11. Plumb bob.
12. Rod, elevation.
13. Ruler.
14. Saw, power hand (6½ inch blade).
15. Saw, radial arm.
16. Saw, saber.
17. Saw, table.
18. Shears, tinners (long handle).
19. Stapler, hammer type.
20. Stapler, squeeze type (Bostitch T5 size).

21. Tools, hand (kit):
    auger bit set
    automatic drill
    bit brace
    block plane
    chalk box
    claw hammer (13, 16 and 20 oz.)
    combination square
    expansive bit (7/8 to 3 inch)
    framing square
    hack saw
    hand saw (8 and 10 pt.)
    keyhole saw (with nest of blades)
    nail claw
    nail sets (1/32, 2/32, 4/32 and 5/32 inch)
    screwdriver, four in one
    screwdriver, Phillips, (set)
    screwdriver, slot (set)
    sliding T level
    spiral screwdriver
    spirit level
    tape measure (100 ft., 12 ft. and 16 ft.)
    tool box
    utility knife
    wood chisel (set of 6: ¼" to 1¼" in ¼" increments)
    wrench, adjustable

22. Transit and tripod.

7/10/75

Student: ______________________ File Code: 70.01.00.00.A2-2

Date: ______________________ Date Published: 8-8-77

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

COURSE TEST: ROUGH-IN

70.01.01.01

1. When laying out building lines, the most qualified person to perform the layout of building lines is:

    a. the carpenter.
    b. the owner.
    c. a surveyor.
    d. a civil engineer.

2. It is essential that the carpenter be aware of:

    a. building codes - city.
    b. building codes - state.
    c. building codes - national.
    d. all of the above.

3. When staking out corner stakes for a building site, strings should be attached to the:

    a. stakes.
    b. batter post.
    c. nailes on stakes.
    d. nails on batter posts.

4. Before site layout, building sites on rough terrain should be:

    a. finish graded.
    b. rough graded.
    c. leveled.
    d. landscaped.

5. Which of the following should be stored upon starting a building project:

    a. all clay formations.
    b. shrubbery.
    c. existing structure.
    d. top soil.

70.01.01.02

6. In the use of leveling instruments, the _______ replaces the chalkline on straightedge.

    a. instrument.
    b. human.
    c. line of site.
    d. rod.

70.01.01.02 (continued)

7. When comparing the builder's level and the transit level:

   a. both instruments perform the same function.
   b. the transit level is more versatile.
   c. both instruments can move in the vertical plane.
   d. the builder's level is more versatile.

8. To position a transit leveling instrument directly over a given point, which of the following tools is used?

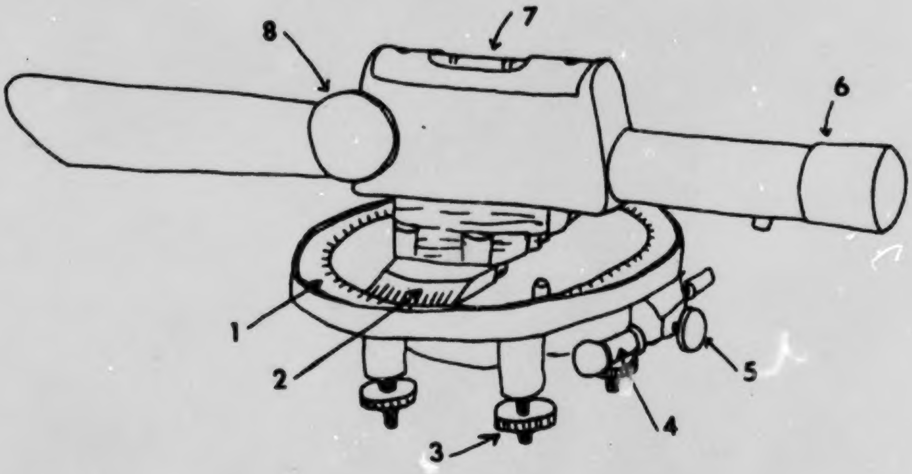
   a. level.
   b. straightedge.
   c. square.
   d. plumb bob.

9. A circle is divided into_____ degrees.

   a. 360 degrees.
   b. 275 degrees.
   c. 300 degrees.
   d. 220 degrees.

10. In the illustration of the leveling instrument (below), which letter would correspond to the focusing knob?

   a. 8.
   b. 1.
   c. 3.
   d. 7.



70.01.01.03

11. How much higher is the finish floor than the elevation on the east corner of the house (see plan)?

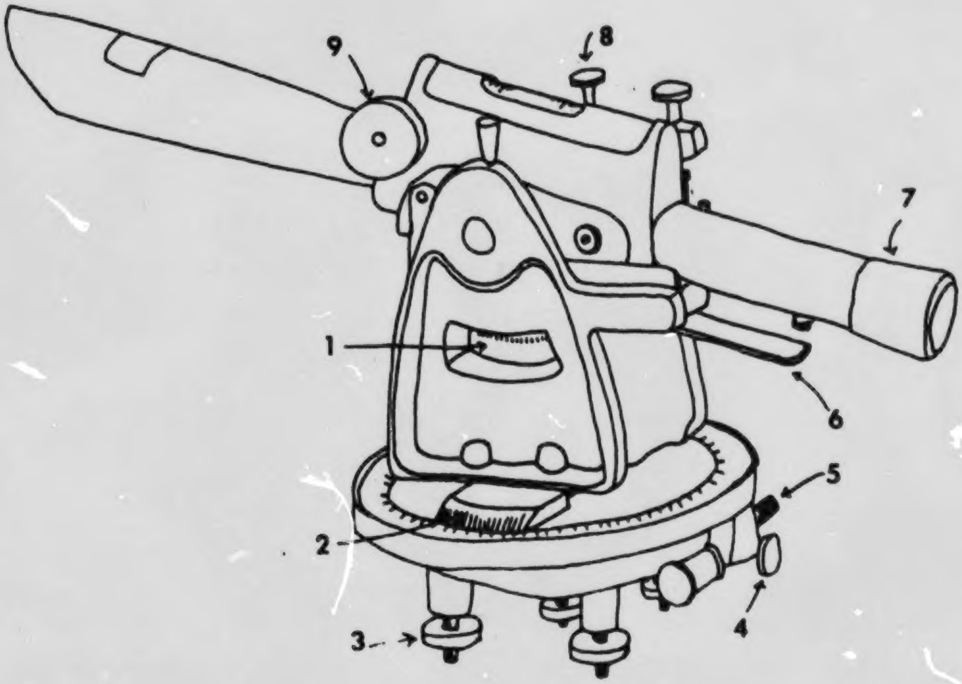
    a. 1'6"
    b. 1'5"
    c. 1"
    d. 2".5"

12. Using the level-transit illustration, which letter would identify the leveling screw?

    a. 1
    b. 2
    c. 3
    d. 4

13. Using the level-tranist illustrations, which letter would identify the vertical index pointer?

    a. 1
    b. 2
    c. 3
    d. 4



70.01.01.03 (continued)

14. Using the level-transit illustration on the previous page, which letter would identify the level lock lever?

    a. 8
    b. 7
    c. 6
    d. 9

15. Using the level-tranist illustration on the previous page, which letter would identify the horizontal tangent screw?

    a. 2
    b. 5
    c. 4
    d. 3

70.01.01.04

16. Batter boards are used to lay out:

    a. wall height.
    b. ceiling lines.
    c. floor height.
    d. footing lines.

17. Batter boards should be located__________ feet or more from the building line.

    a. 2
    b. 4
    c. 1
    d. 7

18. Stakes on batter boards should be placed so that:

    a. they are oblique to the building.
    b. they are loose soil for easy removal.
    c. they are horizontal with building lines.
    d. all markings for lay out are between the stakes.

19. What size material is usually used for making the stakes for batter boards?

    a. 2 x 4
    b. 1 x 2
    c. 2 x 2
    d. 1 x 4

70.01.01.04 (continued)

20. What is the minimum distance batter boards should be located from the building lines?

    a. 1'
    b. 2'
    c. 3'
    d. 4'

70.01.01.05

21. The standard unit of measure of concrete is the:

    a. cubic inch.
    b. square inch.
    c. cubic foot.
    d. cubic yard.

22. How many cubic feet are in a cubic yard of concrete?

    a. 9
    b. 27
    c. 3
    d. 12

23. How much concrete will it take to pour a footing 10' long, 1' thick and 1' wide?

    a. 2 yards.
    b. 1/2 cubic yard.
    c. 1 cubic yard.
    d. 1/3 cubic yard.

24. How much concrete will it take to pour a wall 8" thick, 10' long, and 2' high?

    a. 50 cubic yards.
    b. 5 cubic yards.
    c. .5 cubic yards.
    d. 2.5 cubic yards.

25. What is the height of the house foundation wall (See plan Section A-A)?

    a. 8'3"
    b. 8'7"
    c. 8'1'
    d. 8'0"

70.01.01.06

26. A chemical action that occurs between water and Portland Cement is called:

    a. hydration.
    b. calcium chlorination.
    c. sulfation.
    d. air entrainment.

70.01.01.06 (continued)

27. What is the minimum number of gallons of water per cubic yard of concrete that is required for the process of hydration to occur?

    a. 5 gallons.
    b. 1 gallon.
    c. 2 gallons.
    d. 3 gallons.

28. In order for hydration to occur it is necessary to prevent:

    a. evaporation.
    b. high early setting.
    c. sulfation.
    d. air entrainment.

29. Proper curing of concrete for 7 days will increase concrete strength by approximately what percentage?

    a. 30%
    b. 10%
    c. 20%
    d. 50%

30. Twenty-eight days of moist curing concrete will ____________ the strength of the concrete.

    a. triple.
    b. double.
    c. quadruple.
    d. lesson.

70.01.01.07

31. A groove formed in a footing to provide a lock between pours is called a:

    a. notch.
    b. keyway.
    c. cold joint.
    d. expansion joint.

32. The ability of concrete to resist twisting is called:

    a. density.
    b. compressive strength.
    c. compression strength.
    d. tensile strength.

70.01.01.07 (continued)

33. In the footing illustration, which number would correspond to the footing width?

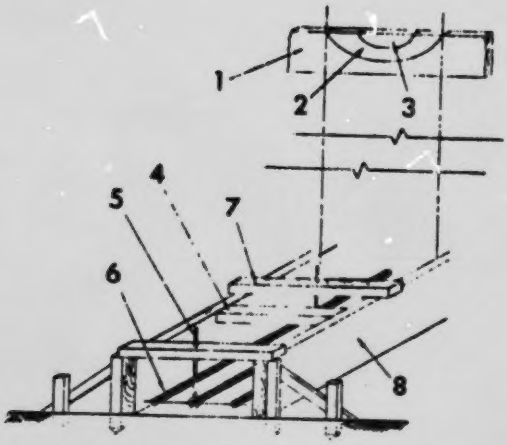
    a. 1
    b. 3
    c. 2
    d. 4

34. In the footing illustration, which number would correspond to the rod holder?

    a. 4
    b. 6
    c. 7
    d. 5

35. In the footing illustration, which number corresponds to the reinforcing steel?

    a. 5
    b. 7
    c. 8
    d. 6



70.01.01.08

36. What is the diameter of the anchor bolt used in the garage foundation (See plan Section C-C)?

    a. 5/8"
    b. 3/8"
    c. 1/2"
    d. 3/4"

70.01.01.08 (continued)

37. Anchor bolts on the garage foundation hold down a structural member. What size is this member (See Section C-C)?

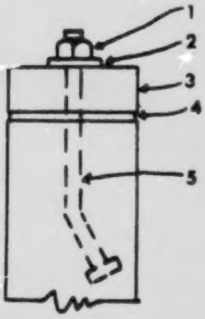
    a. 2 x 4
    b. 4 x 6
    c. 2 x 6
    d. 4 x 4

38. A guide used to accurately drill holes in sill is called:

    a. drill.
    b. template.
    c. draw knife.
    d. drill index.

39. In the typical anchor bolt illustration below, which number would correspond to the sill?

    a. 4
    b. 3
    c. 5
    d. 1



40. Taking into consideration two walls meet to make a corner, how many anchor bolts should be placed near the corners of a foundation?

    a. 4
    b. 2
    c. 3
    d. 1

70.01.01.09

41. How much concrete would be required for a wall 150' x 8' x 1' and footing 150' x 16" x 1'?

    a. 48.2 yards.
    b. 60.4 yards.
    c. 51.1 yards.
    d. 39.6 yards.

42. How much concrete would be needed for a wall 25' x 2' x 6" and footing 25' x 1' x 6"?

    a. 3.7 yards.
    b. .5 yards.
    c. 1.4 yards.
    d. 8.2 yards

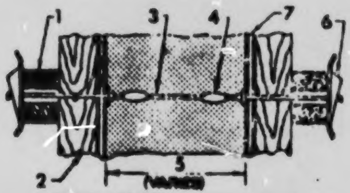
70.01.01.09 (continued)

43. Using the Form Assembly (Wedge-Type) illustration, which number corresponds to the stud of the Form Assembly?

a. 3
b. 2
c. 4
d. 5

44. Using the Form Asembly (Wedge-Type) illustration, which letter corresponds to the Form of the Form Assembly?

a. 3
b. 1
c. 2
d. 7



FORM ASSEMBLY (WEDGE-TYPE)

45. The nails used with forms to set foundation are generally:

a. duplex head.
b. galvanized box.
c. finish.
d. barbed.

70.01.01.10 & 70.01.01.11

46. To install the beam pocket, it is most common to work from:

a. center pocket to edge beam.
b. edge beam to center pocket.
c. center beam to center pocket
d. edge pocket to center beam.

47. Where should the headpiece be placed, when framing the opening buck?

a. dado into side pieces.
b. into side pieces.
c. cleated into side pieces.
d. over side pieces.

70.01.01.10 & 70.01.01.11 (continued)

48. In the illustration of the foundation and slab, which number would correspond to or identify the wall spacer block?

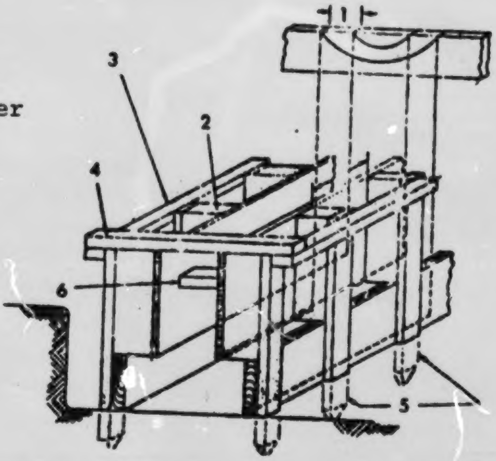
a. 6
b. 5
c. 7
d. 8

49. In the illustration of the foundation and slab, which number would correspond to or identify the foundation wall support?

a. 2
b. 5
c. 6
d. 7

50. In the illustration of the square footing wall assembly, which number would correspond to waler?

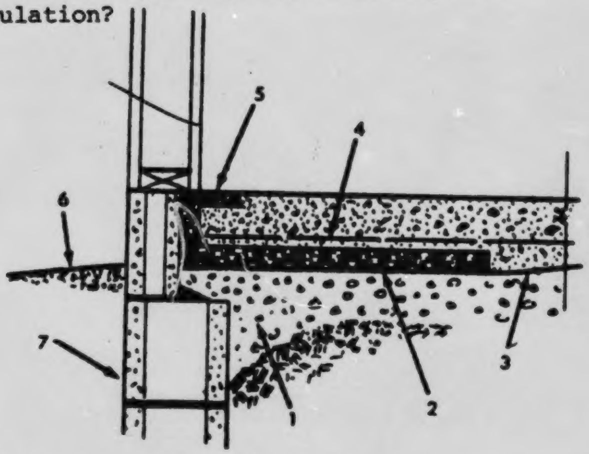
a. 3
b. 4
c. 5
d. 1



70.01.01.12

51. Using the illustration (Figure #9), (slab-on-ground/wood frame), which number corresponds to the rigid insulation?

a. 4
b. 3
c. 2
d. 5



52. Using the illustration in number 51, (Figure #9), (slab-on-ground/wood frame), which number corresponds to the membrane damproofing?

a. 5
b. 4
c. 3
d. 6

70.01.01.12 (continued)

53. Using the illustration on page 10, number 51, (Figure #9), (slab-on-ground/wood frame), which number corresponds to the tack strip?

    a. 5
    b. 6
    c. 1
    d. 2

54. Using the illustration on page 10, number 51, (Figure #9), (slab-on-ground/wood frame), which number corresponds to the metal reinforcement?

    a. 4
    b. 5
    c. 6
    d. 1

55. Using the illustration on page 10, number 51, (Figure #9), (slab-on-ground/wood frame), which number corresponds to the concrete block?

    a. 3
    b. 4
    c. 7
    d. 6

70.01.01.13

56. If the steps are more than 3' wide when constructing concrete steps, what is the minimum thickness of the risers?

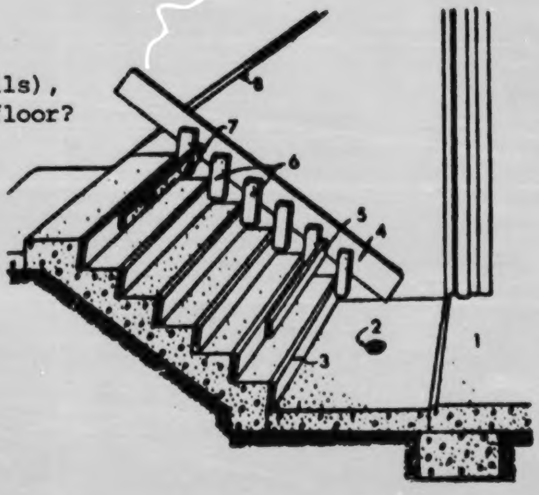
    a. 3/4"
    b. 1'
    c. 2"
    d. 3"

57. The bottom edge of step riser forms are:

    a. square.
    b. beveled.
    c. round.
    d. dadoed.

58. In figure #10, (steps between existing walls), which number corresponds to the basement floor?

    a. 1
    b. 2
    c. 3
    d. 4



70.01.01.13 (continued)

59. In Figure #10, (steps between existing walls), (refer to page 11, #58), which number corresponds to the riser supports?

a. 6
b. 7
c. 8
d. 1

60. In figure #10, (steps between existing walls), (refer to page 11, #58), which number corresponds to the concrete sidewall?

a. 8
b. 1
c. 2
d. 3

70.01.01.14

61. Concrete screeds are usually supported by:

a. concrete.
b. rocks.
c. stakes.
d. bricks.

62. Concrete screeds are used to perform which of the following functions?

a. level concrete.
b. plumb concrete.
c. place concrete vertically.
d. place conrete perpendicular.

63. If the tops of screeds are set to the top of concrete, which of the following must be done by the mason?

a. re-establish the concrete grade.
b. level slab to bottom instead.
c. use a mechanical vibrator.
d. remove screeds and fill void.

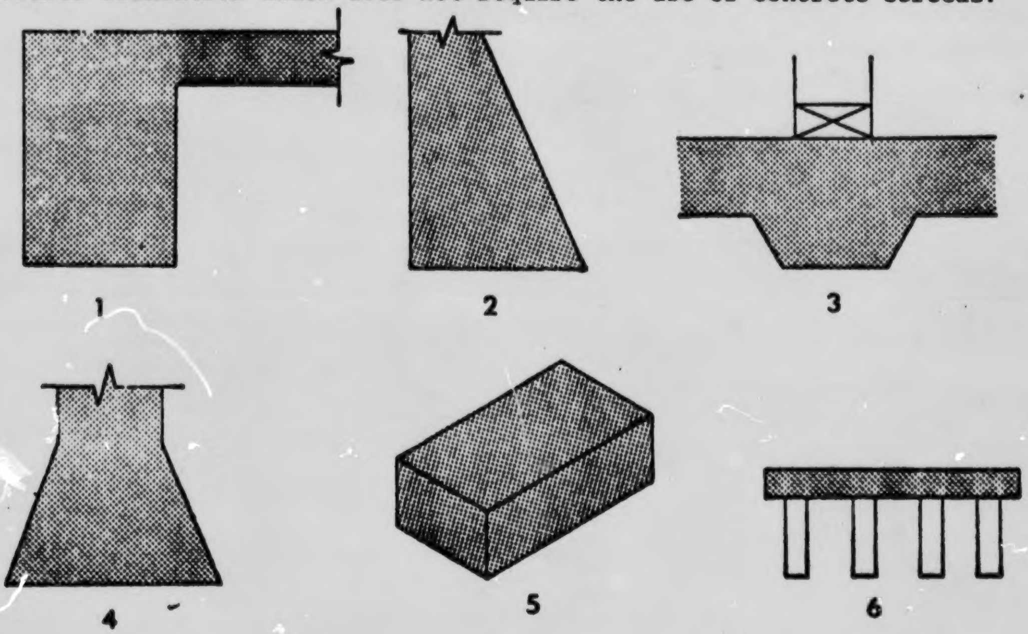
64. If reinforcement bars are used to join slabs, they must:

a. be installed after concrete takes its set.
b. protrude through the slab forms.
c. be lugged bars.
d. be smooth bars.

70.01.01.14 (continued)

65. In the illustration below (TYPES OF FOUNDATIONS), which number corresponds to a battered foundation which does not require the use of concrete screeds?

   a. 5
   b. 3
   c. 4
   d. 2



COMMON TYPES OF FOUNDATIONS

70.01.01.15

66. In the illustrations of concrete tools, which figure would correspond to a tool that is used for final hand finishing?

   a. Figure 44
   b. Figure 45
   c. Figure 47
   d. Figure 40

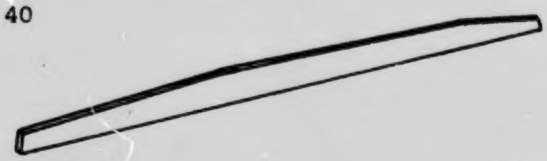


Fig. 36.

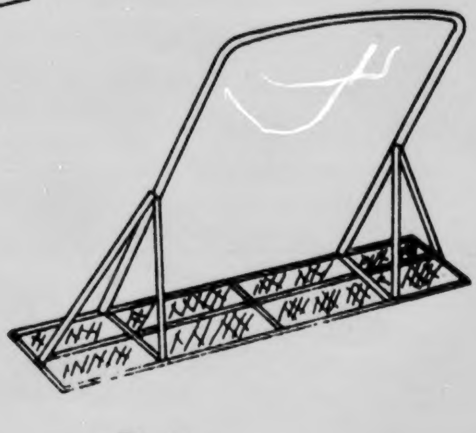


Fig. 38

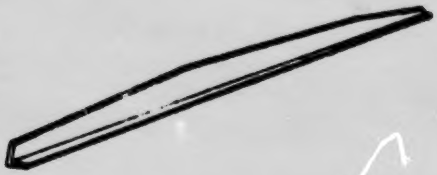


Fig. 37

70.01.01.15 (continued)

THE FOLLOWING ARE ILLUSTRATIONS OF CONCRETE TOOLS USED IN QUESTIONS 66 through 70.

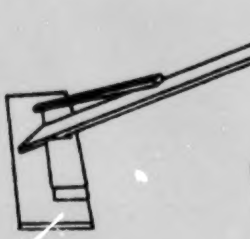


Fig. 40.

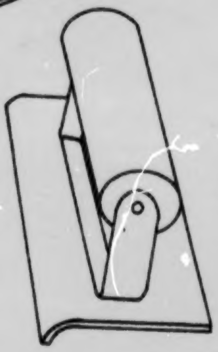


Fig. 41.

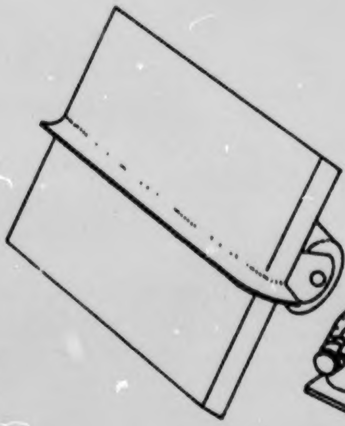


Fig. 42.

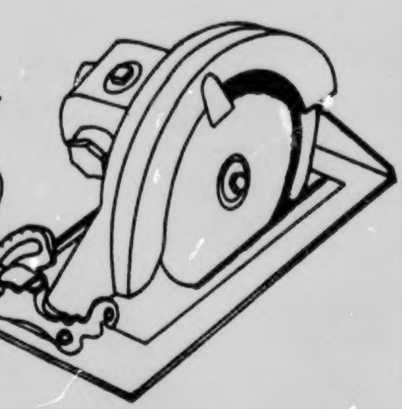


Fig. 43.

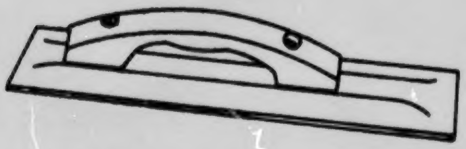


Fig. 44. Metal

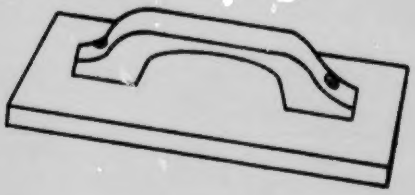


Fig. 45. Wood

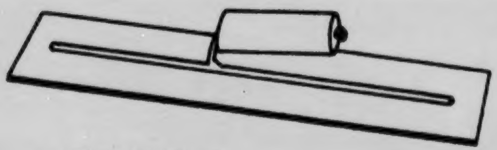


Fig. 47. Steel

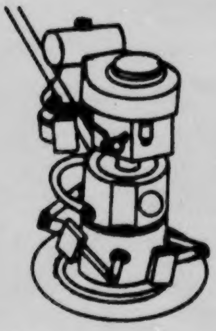


Fig. 46.

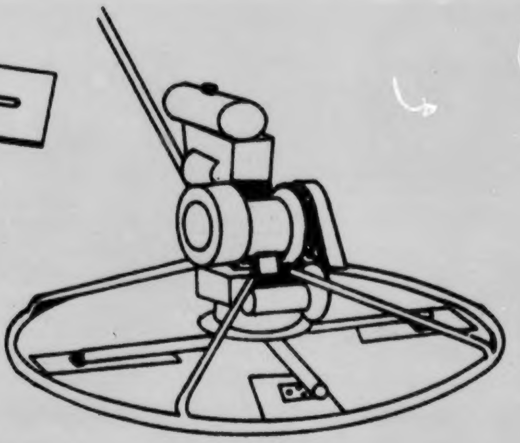


Fig. 48.

70.01.01.15 (continued)

67. In the illustrations of concrete tools (pages 13 & 14), which figure would correspond to a tool that is used for edging plastic concrete?

a. Figure 37
b. Figure 42
c. Figure 36
d. Figure 41

68. In the illustrations of concrete tools, (pages 13 & 14), which figure corresponds to a tool that is used for power finishing?

a. Figure 45
b. Figure 46
c. Figure 43
d. Figure 48

69. In the illustrations of concrete tools, (pages 13 & 14), which figure corresponds to a tool that is used for bull floating?

a. Figure 44
b. Figure 40
c. Figure 45
d. Figure 47

70. In the illustrations of concrete tools, which figure corresponds to a tool that is used for floating just prior to troweling? (See pages 13 & 14).

a. Figure 40
b. Figure 43
c. Figure 47
d. Figure 44

70.01.01.16

71. A construction joint is commonly called a(n):

a. dumpy joint.
b. expansion joint.
c. expansive joint.
d. control joint.

72. A slang name for a construction joint is:

a. expansive joint.
b. expansion joint.
c. dumpy joint.
d. control joint.

73. What type of joint is used when a slab abuts a rigid object?

a. construction joint.
b. control joint.
c. dumpy joint.
d. expansion joint.

70.01.01.27

74. Control joints in slabs must be placed a maximum of____________ feet.

    a. 15
    b. 10
    c. 12
    d. 25

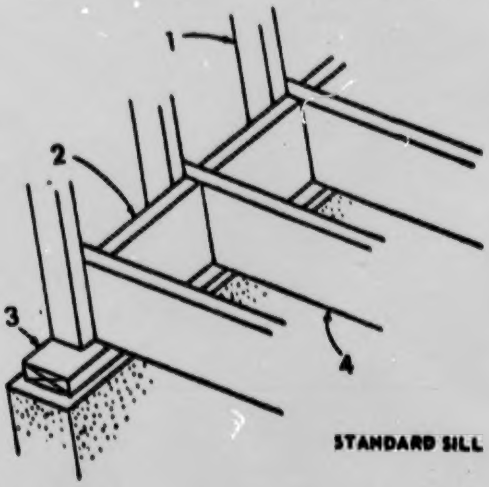
75. Construction joints should be laid out in what type of pattern if possible?

    a. square.
    b. round.
    c. rectangular.
    d. triangular.

70.01.02.01

76. On the standard sill illustration below, which number would correspond to the fire stripping?

    a. 4
    b. 1
    c. 3
    d. 2



STANDARD SILL

77. On the standard sill illustration (question #76), which number would correspond to the mud sill?

    a. 4
    b. 1
    c. 3
    d. 2

78. On the standard sill illustration (question #76), which number would correspond to the stud?

    a. 1
    b. 3
    c. 2
    d. 4

70.01.02.01 (continued)

79. The member that lies flat on the foundation of a house is called a(n):

- a. box sill.
- b. mud sill.
- c. header.
- d. apron.

80. Which of these statements refers to the floor joist?

- a. it is the member used to provide rough openings.
- b. it boxes the end of structural members.
- c. it is the last outside joist.
- d. it supports floor from mud sill to girder.

70.01.02.02

81. Mud sills are fastened to foundations with:

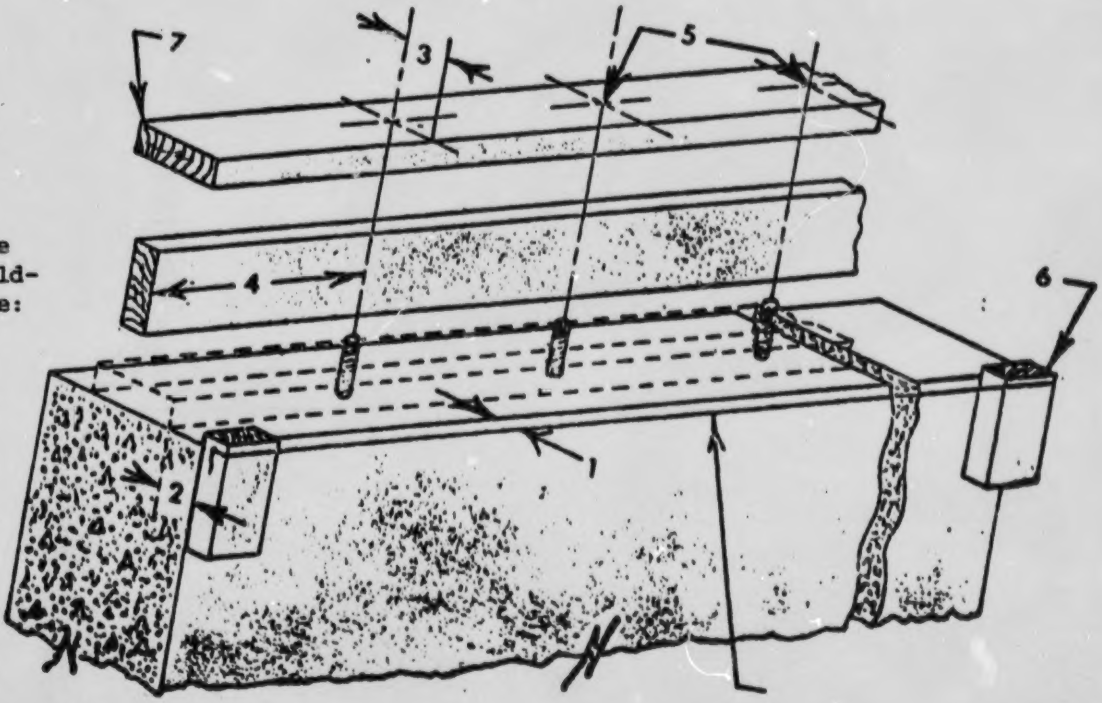
- a. nails.
- b. anchor bolts.
- c. grout.
- d. screws.

82. Anchor bolts should be placed approximately _______ from the corners of foundations:

- a. on the corner
- b. 6'
- c. 1'
- d. 2'

83. In the diagram below, which point would be the building line:

- a. 1
- b. 3
- c. 2
- d. 5



70.01.02.02 (continued)

84. In the diagram on the preceding page #17, the end of the sill plate is indicated by which number?

a. 4
b. 1
c. 7
d. 5

85. In the diagram on the preceding page #17, when marking bolt center requires the plate to be:

a. on end.
b. inclined.
c. on edge.
d. level.

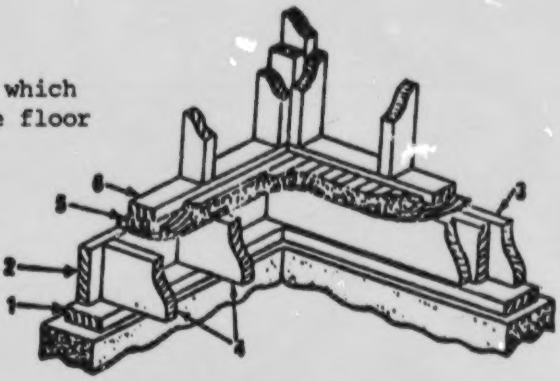
70.01.02.03

86. When laying out the box sill for floor joists, what is the usual first measurement to the first joist from the car of the box sill if joists are considered 2" nominal dimension and joists are on 24" o.c.?

a. 23 3/4
b. 22 1/2
c. 23 1/4"
d. 24"

87. In the box sill illustration, which number would correspond to the floor joist?

a. 4
b. 1
c. 2
d. 3



BOX SILL

88. How many joists are required under partitions running parallel with the floor joist?

a. 1
b. 2
c. 3
d. 4

89. What size are the joists in the bedroom (see plan)?

a. 2 x 6
b. 2 x 8
c. 2 x 10
d. 2 x 4

70.01.02.03 (continued)

90. What is the length of the floor joist over the living room (see plan on page 18, #87)?

    a. 16'
    b. 14'
    c. 12'
    d. 18'

70.01.02.04 & 70.01.02.05

91. What size girder is used in the living room over the basement (see plan on page 18, #87)?

    a. 8 x 10
    b. 8 x 12
    c. 6 x 10
    d. 8 x 14

92. What type of girder is the one that supports the living room floor?

    a. flush (clear span).
    b. beam/post.
    c. clean span steel.
    d. clear span iron.

93. Approximately how long is the beam or girder that supports the living room (see plan on page 18, #87)?

    a. 16'
    b. 10'
    c. 14'
    d. 12'

94. What size is the girder in the garage area (see plan on page 18, #87)?

    a. 6 x 8
    b. 6 x 10
    c. 2 x 6
    d. 2 x 8

95. What size material would be used to construct the beam or girder in the garage (see plan on page 18, #87)?

    a. 2 x 12
    b. 2 x 6
    c. 2 x 10
    d. 2 x 8

70.01.02.06

96. When floor joists are turned on edge and sighted, the curved surface is commonly called:

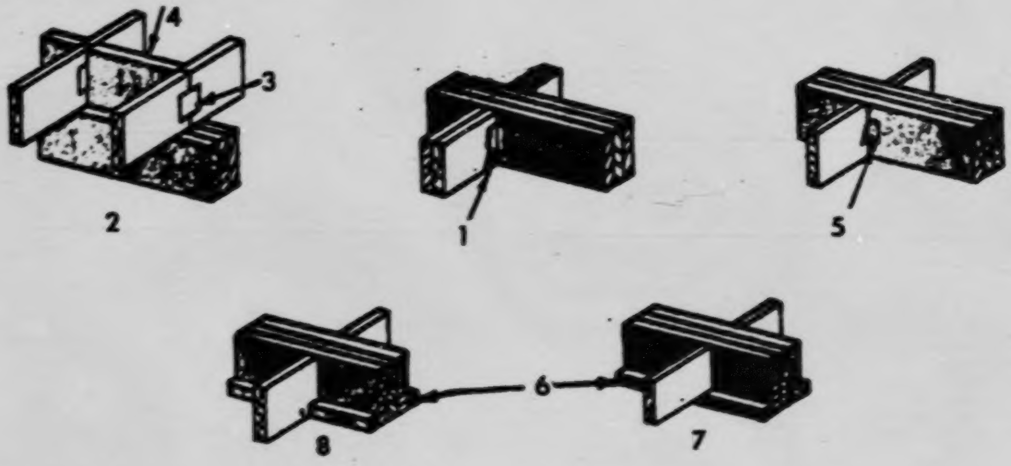
    a. hump.
    b. crown.
    c. bevel.
    d. salvage.

97. A fire cut joist has which of the following types of cut?

    a. inclined.
    b. square.
    c. plumb.
    d. perpendicular.

98. In the illustration below (Figure #15), which number would correspond to the in line joist illustration?

    a. 2
    b. 1
    c. 8
    d. 7



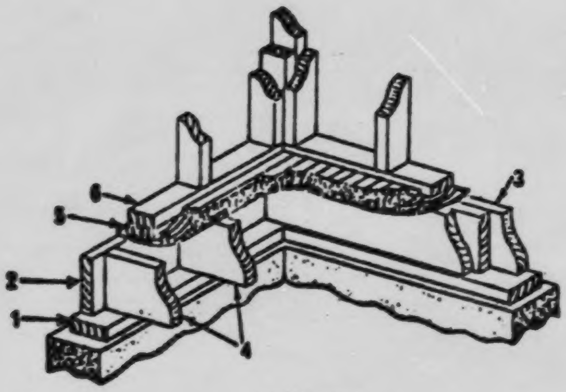
99. In the illustration above (Figure #15), which number would correspond to the leger supported joist illustration without notch?

    a. 7
    b. 8
    c. 1
    d. 5

70.01.02.06 (continued)

100. In the box sill illustration below, which number would correspond to the floor joist?

- a. 4
- b. 3
- c. 1
- d. 2



BOX SILL

70.01.02.07 & 70.01.02.08

101. When cross bridging is installed, how is the weight distributed if a man is standing on only one joist?

- a. on one joist.
- b. on several joists.
- c. on two joists.
- d. it is not ditributed.

70.01.02.07 & 70.01.02.08 (continued)

102. Bridging is required if joist span is over what distance?

    a. 12'
    b. 10'
    c. 8'
    d. 13'

103. What degree of cut is necessary when the ends of bridging are on the flat plane (across the face)?

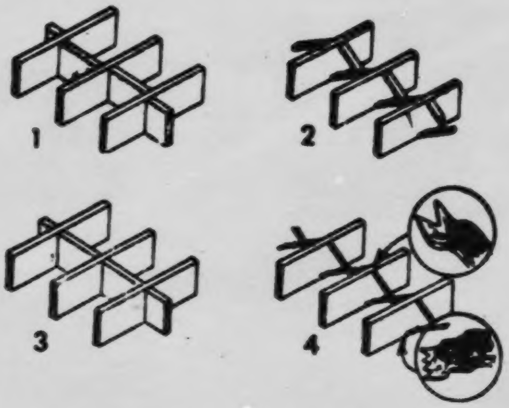
    a. 75 degrees.
    b. 45 degrees.
    c. 33.3 degrees.
    d. 90 degrees.

104. In the illustration below of the types of bridging, which number would correspond to wood cross bridging?

    a. 1
    b. 3
    c. 4
    d. 2

105. In the illustration below of the types of bridging, which number would correspond to solid bridging in line?

    a. 1
    b. 3
    c. 2
    d. 4



TYPES OF BRIDGING

70.01.02.09

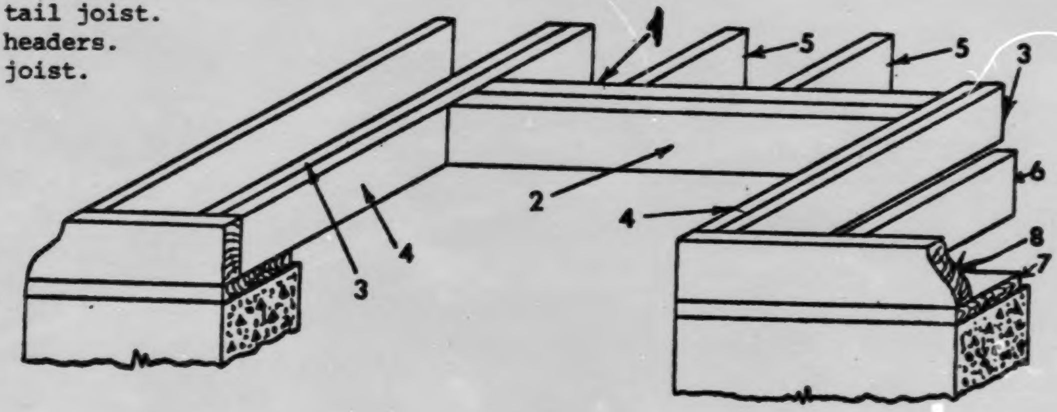
106. How are tail joists positioned in relation to the centers of the floor joist?

    a. not placed on the same center.
    b. on alternate layout centers.
    c. on opposite layout centers.
    d. on the same layout centers.

70.01.02.09 (continued)

107. In the illustration below, (Figure 18), the member(s) labeled "Number 2" is/are called which of the following?

    a. floor joist.
    b. tail joist.
    c. headers.
    d. joist.



108. In the illustration above, (Figure 18), the member(s) labeled "Number 5" is/are called which of the following?

    a. cripple (tail) joist.
    b. header joist.
    c. rim joist.
    d. box sill.

109. In the illustration above, (Figure 18), the member(s) labeled "Number 4" is/are called which of the following?

    a. rim joist.
    b. headers.
    c. floor joist (trimmer)
    d. Box sill.

110. In the illustration above, (Figure 18), of a stairwell opening, which Number would correspond to the first member(s) to be installed when making a stairwell?

    a. 1
    b. 4
    c. 2
    d. 3

111. If the width of subflooring boards is less than six inches, how many nails are required in each board?

a. 3
b. 2
c. 4
d. 5

112. The minimum thickness of plywood allowed by the FHA standards on joists 16" o.c. is:

a. 3/8" CD Shop
b. 1/2" CD Shop
c. 5/8" CD X
d. 1/2" CD X

113. The nails on the edges of the plywood should be nailed less than how many inches apart?

a. 6"
b. 8"
c. 10"
d. 12"

114. The nails on the center portion of plywood should be nailed less than how many inches apart?

a. 12"
b. 6"
c. 10"
d. 8"

115. What size of nail is recommended when installing plywood subfloor?

a. 10d box.
b. 8d box.
c. 6d box.
d. 12d box.

70.01.02.12

116. When joists are doubled for additional support:

a. the O.C. spacing is increased.
b. the length of the bridging is not changed.
c. the plywood subfloor cannot be used.
d. none of the above.

70.01.02.12 (continued)

117. Approximately how many feet of box sill and rim joist will the house require (see plan)?

   a. 190"
   b. 275'
   c. 150'
   d. 350'

118. What is the dimension of the box sill and rim joist (see plan)?

   a. 2 x 12
   b. 2 x 8
   c. 2 x 10
   d. 2 x 6

119. Approximately how many lineal feet of sill plate will be required for the garage area? (see plan)

   a. 70'
   b. 74'
   c. 90'
   d. 24'

120. What size are the floor joists in the bedroom area?

   a. 2 x 10
   b. 2 x 12
   c. 2 x 8
   d. 2 x 6

70.01.02.13

121. In Figure 19 on the following page, which number would correspond to the cripple studs?

   a. 1
   b. 9
   c. 10
   d. 8

122. In Figure 19 on the following page, which number would correspond to the double header?

   a. 6
   b. 7
   c. 4
   d. 9

123. In Figure 19 on the following page, which number would correspond to the broken plate joists?

   a. 1
   b. 10
   c. 6
   d. 3

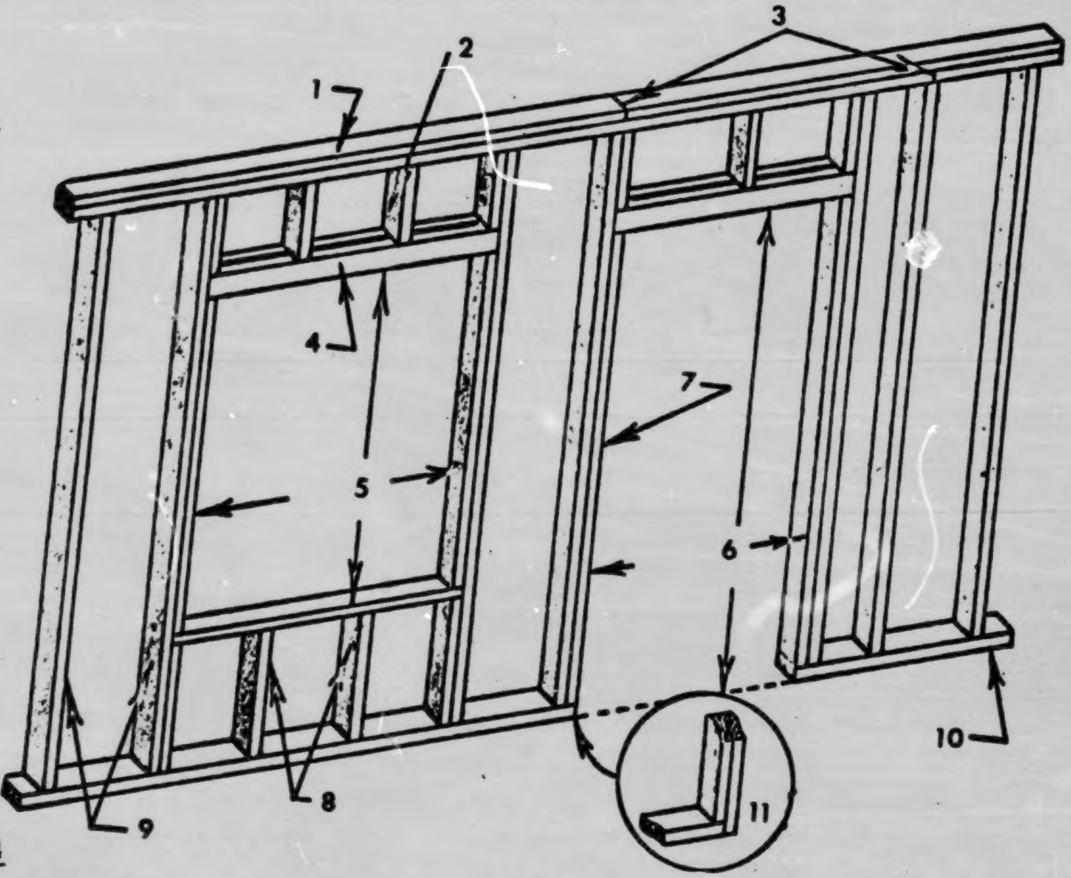
70.01.02.13 (continued)

124. In Figure 19, below, which number would correspond to the top double plate?

a. 1
b. 9
c. 10
d. 11

125. In Figure 19, below, which number would correspond to the door rough opening?

a. 6
b. 5
c. 4
d. 11



70.01.02.14

126. Using the table below, what size header would be required for doors lettered M in the house plan (see plan)?

a. 2 x 4
b. 2 x 6
c. 2 x 8
d. 2 x 10

HEADER SPANS

Material on Edge	Supporting one floor, ceiling, roof	Supporting only ceiling and roof
2 x 4	3' - 0"	3' - 6"
2 x 6	5' - 0"	6' - 0"
2 x 8	7' - 0"	8' - 0"
2 x 10	8' - 0"	10' - 0"
2 x 12	9' - 0"	12' - 0"

70.01.02.14 (continued)

127. Using the table on header spans on page 26, question #126, what size header would be required for openings labeled letter N in the house (see plan)?

   a. 2 x 10
   b. 2 x 6
   c. 2 x 8
   d. 2 x 4

128. Using the table on header spans on page 26, question #126, what size header would be required for openings labeled letter G in the house (see plan)?

   a. 2 x 8
   b. 2 x 6
   c. 2 x 4
   d. 2 x 10

129. Using the table on header spans on page 26, question #126, what size header would be required for doors lettered A in the house plan (see plan)?

   a. 2 x 8
   b. 2 x 6
   c. 2 x 4
   d. 2 x 10

130. Using the table on header spans on page 26, question #126, what size header would be required for openings labeled letter L in the house plan (see plan)?

   a. 2 x 6
   b. 2 x 10
   c. 2 x 12
   d. 2 x 8

70.01.02.15

131. In the plan provided, where on the floor plan are the dimensions measured?

   a. from center to center.
   b. from center of stud.
   c. from the outside edge of studs.
   d. from inside edge.

132. When determining the length of a header, how many member thicknesses must be added to the R.O. size?

   a. four.
   b. one.
   c. three.
   d. two.

70.01.02.15 (continued)

133. The members that support the headers in a wall section are called:

- a. sills.
- b. studs.
- c. trimmers.
- d. plates.

134. What is the height to the headers measured from the finished floor in the wall section (see plan)?

- a. 6' 8½"
- b. 6' 8"
- c. 6' 10½"
- d. 6' 9½"

135. Allowing 1" to square the window in the rough opening, what length are the headers in the living room of the house (see plan) SW elevation?

- a. 10' 9"
- b. 11'
- c. 10' 10"
- d. 11' 1"

70.01.02.17

136. In relation to the outside of the structure to the interior partition location, where are most layouts of plates measured?

- a. from inside edge to center.
- b. from center to center.
- c. from center to inside edge.
- d. from outside to center.

137. What is the total width of the bathroom partition measured from NE center to SW center? (see plan)

- a. 10' 9"
- b. 8' 10"
- c. 17' 4"
- d. 12' 9"

138. How deep is the bathroom from the outside wall to the inside partition that has a door in it?

- a. 8' 0"
- b. 10' 4"
- c. 10' ½"
- d. 10' 2½"

70.01.02.17 (continued)

139. How wide is the living room center to center (see plan)?

   a. 14' 10½"
   b. 14' 7"
   c. 14' 9"
   d. 14' 8"

140. How long is the living room outside to center of the inside partition (see plan)?

   a. 23' 3"
   b. 23' 4½"
   c. 24' 2"
   d. 25' 7"

70.01.02.18

141. When considering intersecting partitions, the top plate that runs into the outside wall must be:

   a. cut flush with the bottom plate.
   b. extended over the bottom plate.
   c. cut back from the bottom plate.
   d. extended 1/2 the thickness of the wall.

142. A trussed opening in a wall frame section:

   a. distributes the weight to the studs and trimmers.
   b. replaces the double header.
   c. eliminates a center support in the opening.
   d. provides an additional nailing surface.

143. The header sill in a 10' -0" width rough opening window sill is doubled to:

   a. provide additional support for the finish window sill.
   b. keep from using solid stock.
   c. make the dwarf wall section rigid and keep it in line for the finished window.
   d. strengthen the top wall plate.

144. Fire blocking is required when:

   a. the wall is under 8'6"
   b. the wall is over 8'0"
   c. the wall is under 8'0"
   d. the wall is over 9'0"

145. What is the minimum length the top plate should be from lower top plate splices?

   a. 2'
   b. 3'
   c. 4'
   d. 5'

70.01.02.19

146. What is the spacing of the studs in the house plan?

    a. 18" o.c.
    b. 12" o.c.
    c. 20" o.c.
    d. 16" o.c.

147. What is the standard pre-cut stud length?

    a. 90"
    b. 91½"
    c. 93"
    d. 90½"

148. The most effective saw to use when cutting dimension lumber to length is the:

    a. skill saw.
    b. table saw.
    c. radial saw.
    d. hand saw.

149. A member that runs from plate to sill in a wall section is called a:

    a. stud.
    b. trimmer.
    c. cripple.
    d. header.

150. A member that is supported by trimmers in a wall section is a:

    a. cripple.
    b. header.
    c. stud.
    d. sill.

70.01.02.20
70.01.02.21
70.01.02.22

151. In two story structures, the exterior wall studs extend from the sill plate to the double top plate in:

    a. balloon framing.
    b. post and beam framing.
    c. western framing.
    d. modern braced framing.

70.01.02.20
70.01.02.21
70.01.02.22 (continued)

152. The ledger used for second floor joists in balloon framing:

    a. is let-in to the studs.
    b. all answers; a,c, and d.
    c. serves to mark the rough ceiling height.
    d. is placed level.

153. The most common fastening methods used by the carpenters for floor joists are:

    a. gluing and nailing.
    b. toe nailing and face nailing.
    c. toe nailing.
    d. face nailing.

154. A face nail makes the strongest joist when:

    a. driven below the surface of the wood.
    b. the shank is not ringed.
    c. the pull (withdrawal) is with the load.
    d. it is bent over.

155. Diagonal let-in braces used in exterior walls are:

    a. set to brace the wall in both directions.
    b. placed at a 60 degree angle.
    c. are usually placed after the wall is plumb and in place.
    d. set on the inside surface of the stud wall.

70.01.02.23

156. How many trimmer studs will be needed in the SE wall section of the house (see plan)?

    a. four
    b. eight
    c. two
    d. six

157. Approximately how many cripple studs will be needed in the SE wall section of the house (see plan)?

    a. 2
    b. 10
    c. 5
    d. 6

70.01.02.23 (continued)

158. If the window sill plates are double in the SE wall section, how many lineal feet of plate will be needed for the window sills in the SE wall section? (see plan)

a. 15'
b. 30'
c. 17'
d. 24'

159. The partition studs in the SE wall require how many full length studs (see plan)?

a. four.
b. two.
c. seven.
d. eight.

160. How many partition stud assemblies are there in the SE wall of the house (see plan)?

a. three.
b. one.
c. two
d. four.

70.01.03.01

161. What size are the joists over the dining room area? (see plan)

a. 2" x 6"
b. 2" x 10"
c. 2" x 8"
d. 2" x 12"

162. What size should the on center spacing be for the ceiling joists in the bedroom/bath area of the house? (see plan)

a. 24" o.c.
b. 12" o.c.
c. 16" o.c.
d. 32" o.c.

163. What length of ceiling joists is required for the back bedroom? (see plan)

a. 16'
b. 12'
c. 14'
d. 10'

70.01.03.01 (continued)

164. By using the accompanying Plan Sheet, one can assess that the ceiling joist material for the living room must be:

a. 16' in length.
b. 14' in length.
c. 12' in length.
d. 18' in length.

165. In which direction do the ceiling joists run? (see plan)

a. with the length.
b. across the width.
c. from exterior wall to exterior wall.
d. from beam to exterior wall.

70.01.03.02

166. Which of the following statements is true for the placement of ceiling joists?

a. they are usually smaller than 2" x 4" stock.
b. they are usually placed in between rafters.
c. they are usually placed the same as rafters.
d. they are usually 18" on center.

167. Ceiling joists are usually installed in such a manner as to span:

a. from corner to corner.
b. the longest distance.
c. from the outside wall to the outside wall.
d. the shortest distance.

168. Which of the following on center spacing dimension is not commonly used in ceiling frame construction?

a. 12" o.c.
b. 18" o.c.
c. 16" o.c.
d. 24" o.c.

169. Which number refers to an illustration of a ceiling joist layout that requires partition backing?

a. 4
b. 1
c. 2
d. 3

170. Which number refers to the height left above the plate on a ceiling joist?

a. 6
b. 4
c. 3
d. 1

70.01.03.03

171. In Figure #21 below, which number identifies the end view of a ceiling backing?

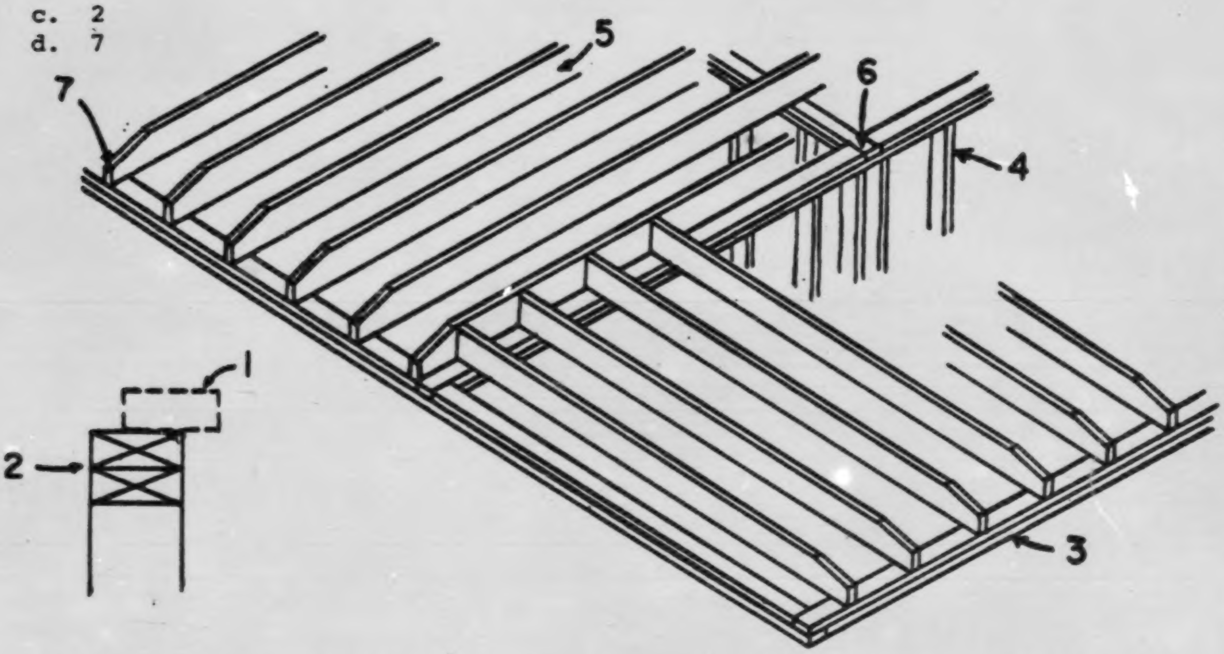
   a. 2
   b. 1
   c. 3
   d. 4

172. In Figure #21 below, which number corresponds to the illustration of an intersecting partition?

   a. 6
   b. 2
   c. 3
   d. 4

173. In Figure #21 below, which number corresponds to the tail cut of a typical ceiling joist?

   a. 3
   b. 1
   c. 2
   d. 7



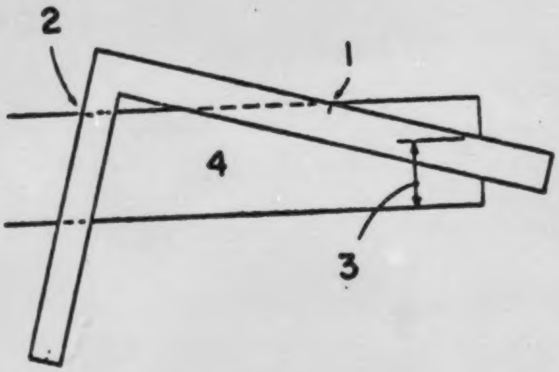
174. Which of the following will be required at the outside edges of a structure, if the ceiling joists run 90 degrees to the roof rafters?

   a. herringbone installation.
   b. bridging.
   c. stub ceiling joists.
   d. waynes coat installation.

70.01.03.03 (continued)

175. In Figure #22 below, which number illustrates the height of the roof rafter off the top plate?

a. 1
b. 3
c. 2
d. 4



70.01.03.04

176. Ceiling backing is used for which of the following purposes?

a. to provide fire resistance.
b. to brace the top portions of partitions.
c. to provide a nailing surface for ceiling coverings.
d. to provide a nailing surface for insulation.

177. Which of the following is place on the top of a partition that runs parallel with the ceiling joists?

a. headers.
b. fire blocking.
c. backing.
d. cripples.

178. If a 2" x 6" wide partition is running with the ceiling joists, what is the minimum size backing member that should be used?

a. 2" x 4"
b. 2" x 8"
c. 2" x 6"
d. 2" x 10"

179. Which of the following best describes the position of backing members in relation to ceiling joists?

a. the bottom of the backing is above the bottom of the ceiling joists.
b. the bottoms of both members are level with each other.
c. the bottom of the backing is below the bottom of the ceiling joists.
d. the bottom of the backing is flush with the top of the ceiling joists.

70.01.03.04 (continued)

180. What is the minimum length that backing should overlap the edges of a partition?

a. 3/8"
b. 1/8"
c. 1/4"
d. 3/4"

70.01.03.05

181. Access openings are generally installed in the ceiling of:

a. bedrooms.
b. living rooms.
c. passage ways.
d. kitchens.

182. Access openings are generally installed in the ceiling of:

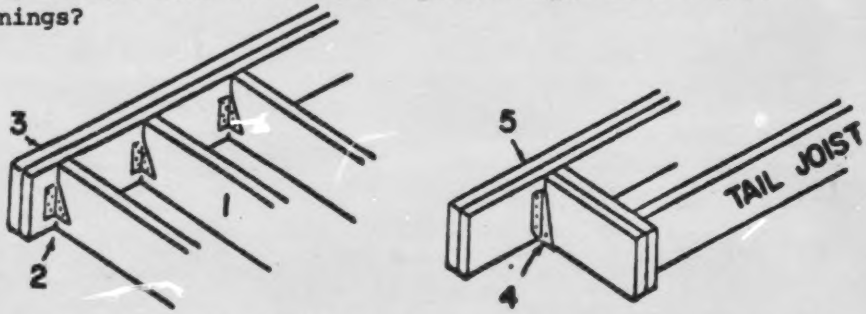
a. living rooms.
b. closets.
c. bedrooms.
d. kitchens.

183. If an access opening requires a ceiling joist to be cut, how many members must be installed to support the cut ceiling joist?

a. 4
b. 1
c. 3
d. 2

184. In the figure below, which number identifies a joist hanger that is often used in access openings?

a. 3
b. 2
c. 4
d. 5



185. In the figure above, question #184, which of the following numbers identifies a typical double trimmer in a ceiling access opening? Remember that the direction of the tail joist must be kept in mind.

a. 1
b. 3
c. 5
d. 2

70.01.03.06

186. A ledger strip provides:

   a. rigidity for rafter studs.
   b. strength for the support beam.
   c. support for the bearing partitions.
   d. additional support for the ceiling joists when connected to the support beam.

187. Which of the following support beams is most commonly used in residential housing?

   a. an "I" beam.
   b. solid.
   c. laminated.
   d. a "H" beam.

188. When additional support is needed in securing ceiling joists to the support beam, one should use:

   a. a ledger strip.
   b. heavy twine.
   c. electrician's tape.
   d. epoxy.

189. Which of the following methods is most commonly used for securing ceiling joists to a support beam?

   a. ring shank nailing.
   b. flush nailing.
   c. lag bolting.
   d. toenailing.

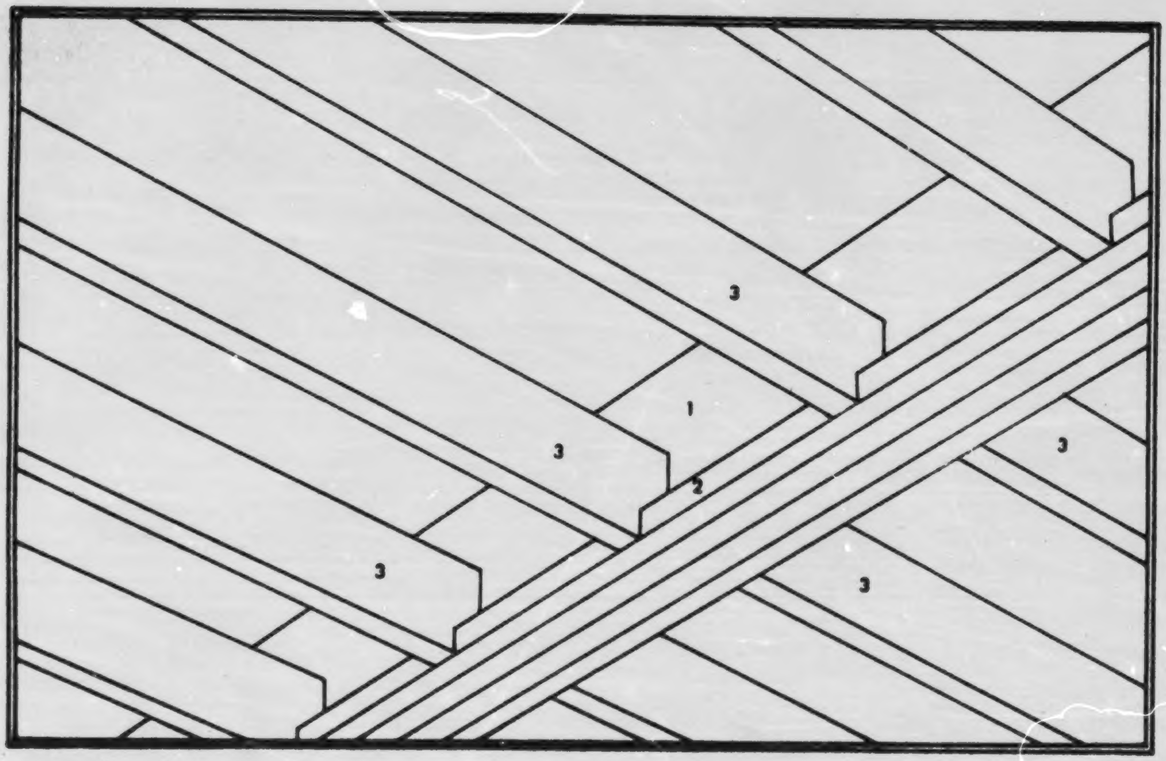
190. Item "2" in the illustration provided on the following page, is a:
   a. ledger strip.
   b. support beam.
   c. spacer block.
   d. rafter stud.

70.01.03.07

191. The first step in installing a strong back is to:

   a. tie ceiling joists and strong back together.
   b. place blocks on wall plates.
   c. place strongback on center line and nail to blocks.
   d. align ceiling joists with stay lath.

70.01.03.06 (illustration for question #190 on page 37):



70.01.03.07 (continued)

192. Which of the following methods should be used to tie the ceiling joists and strong back together?

   a. electrician's tape.
   b. plumber's tape or a 2 x 2.
   c. epoxy.
   d. heavy twine.

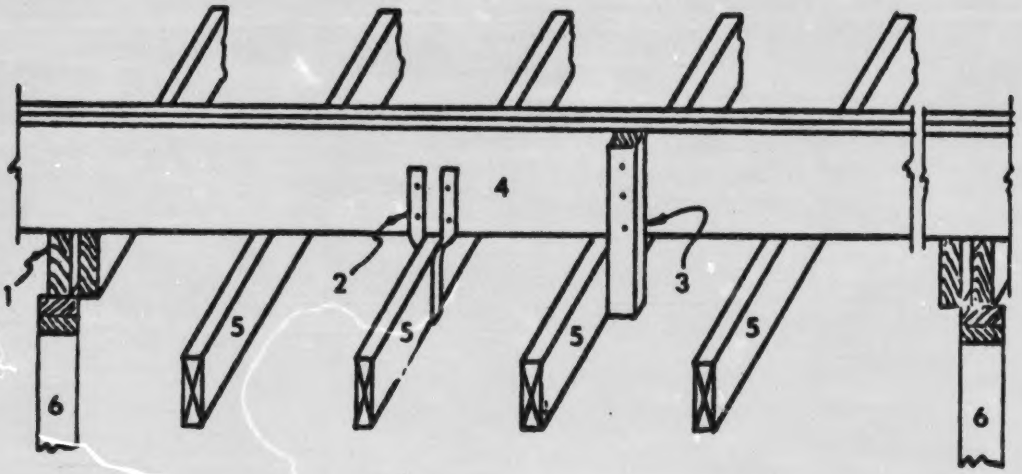
193. Item "1" in the illustration on the following page, is:

   a. a stay lath.
   b. a bearing partition.
   c. a small joist.
   d. a spacer block.

70.01.03.07 (continued)

194. Item "3" in the illustration provided below is used to:

- a. provide alignment for the strong back.
- b. provide support for the ceiling joists.
- c. provide support for the strong back.
- d. keep the two (2) boards that make up the strong back together.



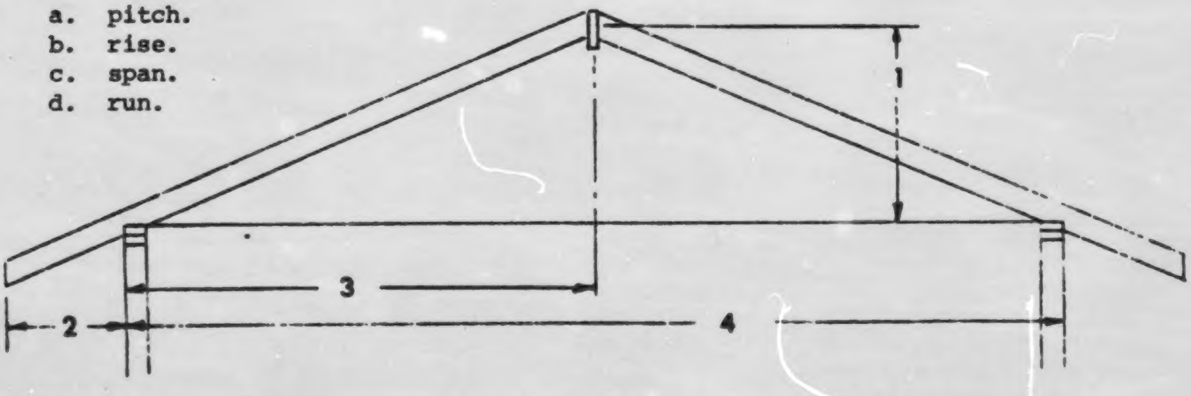
195. In the illustration provided, items "6" (see illustration in above question), are:

- a. bearing partitions.
- b. rafters.
- c. flooring studs.
- d. strong backs.

70.01.04.01 $ 70.01.04.02

196. Using Figure #26, identify number "1":

- a. pitch.
- b. rise.
- c. span.
- d. run.



70.01.04.01 & 70.01.04.02 (continued)

197. Identify number "4" in the Figure provided on page 39, under question #196:

   a. plate.
   b. run.
   c. span.
   d. rise.

198. The ratio of the vertical rise to the horizontal run on an incline roof is called the:

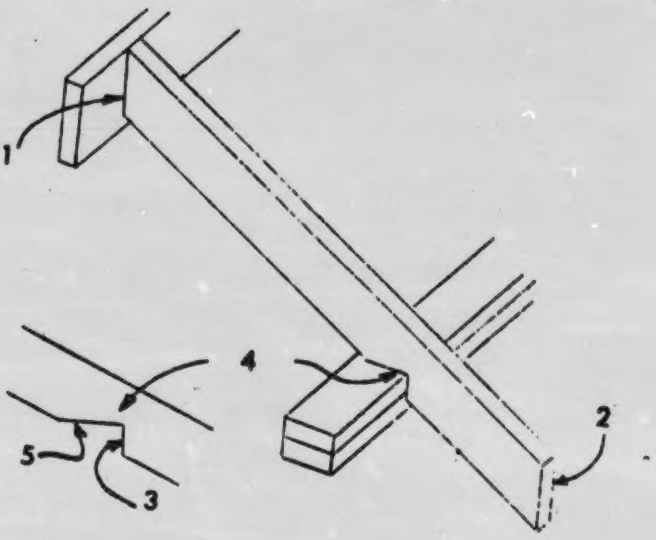
   a. overhang.
   b. rafter length.
   c. slope.
   d. pitch.

199. The ratio of the vertical rise to the horizontal span on an incline roof is called the:

   a. slope.
   b. pitch.
   c. rafter length.
   d. stud.

200. What type of rafter cut is depicted by number "4" in Figure 27?

   a. seat.
   b. bird's mouth.
   c. tail.
   d. plumb.



70.01.04.03

201. Which of the following methods can be used to layout a common rafter?

   a. plumb method.
   b. rule method.
   c. tape method.
   d. step-off method.

70.01.04.03 (continued)

202. Roof framing is based largely on the properties of the:

a. right triangle.
b. isosceles triangle.
c. scalene triangle.
d. equilateral triangle.

203. If the wall framing is already in place, what additional information is needed by the carpenter to visualize roof framing?

a. the unit run and amount of materials needed.
b. the slope of the roof and the amount of overhang required.
c. the type and amount of materials required.
d. the slope and unit run of the roof.

204. Common rafters can be cut to:

a. only the nearest foot.
b. any length.
c. only the nearest inch.
d. only the nearest millimeter.

205. Which of the following terms indicates the incline of a roof as a ratio of the vertical rise to the span (twice the run)?

a. slant.
b. angle of linearity.
c. slope.
d. pitch.

70.01.04.04

206. Common rafters are installed with the crown side:

a. up
b. to the left.
c. down.
d. to the right.

207. How should rafters be nailed to the rafter plate?

a. supported by small blocks of wood nailed to the rafter plate.
b. two nails driven vertically through both the rafter and rafter plate.
c. toe-nailed on one side.
d. toe-nailed on both sides.

208. Common rafters without an overhang should:

a. overhang the rafter plate by ¼ inch.
b. be ¼ inch from the rafter plate.
c. be flush with the rafter plate.
d. rest exactly on ½ of the rafter plate.

70.01.04.04 (continued)

209. Which of the following methods correctly describes rafter installation procedure?

   a. install all the rafters on one side and then all on the other side.
   b. install the end rafters and then install the rafters opposite of each other in a random manner.
   c. install a rafter on one end and then one on the opposite end directly across from it.
   d. install the rafters in any manner just to get them in place.

210. When cutting a common rafter, the craftsman should use a saw equipped with:

   a. a cross-cut blade.
   b. a straight blade.
   c. a ripping blade.
   d. any blade that is handy.

70.01.04.05

211. When installing a hip roof, the first pieces of wood cut are the common rafters and the:

   a. overhangs.
   b. plates.
   c. ridge boards.
   d. bird's-mouth.

212. An item that must be considered when determining the ridge length of a hip roof is:

   a. valley length.
   b. the common rafters.
   c. twice the run.
   d. rafter stock.

213. When two roof surfaces slant upwards from adjoining walls, they meet on a sloping line called a:

   a. hip.
   b. ridge.
   c. common.
   d. truss.

214. Which of the following rafters can be used on a hip roof?

   a. soffit.
   b. stud.
   c. jack.
   d. facia.

70.01.04.05 (continued)

215. To layout a hip rafter, one should use the same procedure as required for a:

   a. joist.
   b. ridge.
   c. common rafter.
   d. plate.

70.01.04.06

216. The principle used in truss design is based on the rigidity of the:

   a. polygon.
   b. rectangle.
   c. square.
   d. triangle.

217. A top chord is the same as a:

   a. compression web.
   b. ceiling joist.
   c. tension web.
   d. roof rafter.

218. Trusses for residential structures can normally be erected:

   a. without special equipment.
   b. with an "A" frame.
   c. with a small, transportable crane.
   d. with the special equipment prescribed.

219. Which of the following is a commonly used roof truss?

   a. standard Z.
   b. V-type.
   c. Johnson-Masterson.
   d. Standard W.

220. Which of the following materials should be used for installing truss rafters?

   a. glue and nails.
   b. nails only.
   c. glue only.
   d. screws only.

70.01.04.07

221. When installing gable studs, the first procedure is to square a line across the end wall plate below the gable.

 a. joist.
 b. rise.
 c. slope.
 d. center.

222. If a ventilator is to be installed in a gable, the carpenter must determine the opening size before placing the first:

 a. plate.
 b. rafter.
 c. stud.
 d. ridge.

223. One method of placing the first gable stud is to stand it upright and plumb it with a:

 a. steel measuring tape.
 b. T-square.
 c. framing square.
 d. level.

224. A common term for an extended rake is a:

 a. rafter.
 b. slope.
 c. gable overhang.
 d. joist.

225. The gable end frame must be completed before completion of the roof:

 a. ridge.
 b. frame.
 c. rake.
 d. valley.

70.01.04.08

226. Before applying sheathing to a roof frame, a carpenter should check to see if all the members are:

 a. vertical.
 b. air tight.
 c. secure.
 d. moisture resistant.

70.01.04.08 (continued)

227. The best purpose that roof sheathing serves is to:

   a. add weatherproofing.
   b. improve appearance.
   c. provide insulation.
   d. add rigidity.

228. A craftsman should start installing roof sheathing at the:

   a. right side.
   b. peak.
   c. left side.
   d. lower edge.

229. If asphalt or other composition shingles are to be used for roof covering, the shiplap or common board sheathing must be:

   a. applied at every other joist.
   b. applied at random lengths.
   c. spaced evenly.
   d. applied solid.

230. When installing wood shingles, tile, or metal sheets, the sheathing may be spaced according to the:

   a. rise.
   b. span length.
   c. course arrangement.
   d. run.

70.01.04.09

231. One type of underlayment material used to cover roof decks is:

   a. cement.
   b. hot tar.
   c. felt paper.
   d. glass.

232. Heavy felt paper should not be used as an underlayment because:

   a. it is too costly.
   b. it will not accept shingle nails.
   c. it has a messy appearance.
   d. moisture may build up.

233. What is usually installed at the overhang edge of roof sheathing?

   a. metal drip edge.
   b. stud.
   c. ridge.
   d. soffit.

70.01.04.09 (continued)

234. General standards for applying underlayment materials is for the toplap of all horizontal joints to:

    a. butt edges.
    b. be 7" long.
    c. be 2" in length.
    d. be 12" in length.

235. On each side of the centerline of hips and valleys, underlayment should be lapped at least:

    a. 10"
    b. 12"
    c. 14"
    d. 6"

70.01.04.10

236. What is the purpose of shingling a roof?

    a. improve appearance.
    b. add weatherproofing.
    c. provide strength.
    d. increase cost.

237. How many times is a roof covered when using interlok shingles?

    a. four.
    b. one.
    c. two.
    d. three.

238. What type of exterior surface is used on interlok shingles?

    a. rubberized.
    b. granulated.
    c. impregnated.
    d. tar.

239. When laying the first course of shingles, a carpenter must remember to lay it:

    a. upside down, face down.
    b. right side up, face up.
    c. right side down, face up.
    d. upside down, face up.

70.01.04.10 (continued)

240. What might affect putting a new shingle roof on top of an existing old one?

   a. the strength of the existing deck.
   b. the color of the old roof.
   c. the roof slope.
   d. the roof rise.

70.01.04.11

241. A major disadvantage in using untreated wood shingles is their low resistance to:

   a. wind.
   b. hail.
   c. fire.
   d. dry rot.

242. From which of the following trees are some wood shingles made?

   a. oak.
   b. pine.
   c. aspen.
   d. cypress.

243. Wood shingles are manufactured in random widths and in lengths of:

   a. 18, 24, and 30 inches.
   b. 12, 14, and 16 inches.
   c. 8, 10, and 12 inches.
   d. 16, 18, and 24 inches.

244. How many layers of wood shingles should a roof have at any given point?

   a. three.
   b. two.
   c. one.
   d. four.

245. What is the proper number of nails used to attach each wood shingle to the roof?

   a. three.
   b. one.
   c. two.
   d. four.

70.01.04.12

246. What is the width of a 3 tab shingle?

a. 14"
b. 10"
c. 12"
d. 16"

247. How many 3 tab shingles are found in a square?

a. 60
b. 80
c. 40
d. 100

248. What size nails should be used for nailing 3 tab shingles to new roofing?

a. 1 3/4"
b. 1 1/4"
c. 2"
d. 1"

249. What size nails should be used for nailing 3 tab shingles over an existing asphalt roof?

a. 1 1/4"
b. 2"
c. 1 3/4"
d. 2 1/4"

250. What type of surface do asphalt shingles have?

a. mineral granules.
b. smooth.
c. rubber.
d. corrugated.

70.01.04.13

251. The on center spacing of the rafters in this structure is:

a. 16" o.c.
b. 12" o.c.
c. 24" o.c.
d. 32" o.c.

252. What type of roof is required by this plan?

a. mansard.
b. gable.
c. gambrel.
d. hip.

70.01.04.13 (continued)

253. In this structural plan, at what angle do the hip rafters run to the facia?

a. 30 degrees.
b. 45 degrees.
c. 15 degrees.
d. 70 degrees.

254. If a house has a span of 24' and a length of 36' and a standard gable roof, how many roof rafters are required if they are placed 16" o.c.?

a. 56
b. 48
c. 64
d. 72

255. Given the same house dimensions as in question #254, but with a 2' overhang, what length material should be ordered if the slope is 4/12?

a. 12'
b. 14'
c. 18'
d. 16'

COURSE PRETEST ANSWER KEY: ROUGH-IN

Occupational Area: ______________________
File Code: 70.01.00.00.A2-2
Name: ______________________

ANSWERS

Unit 01 LAP 01	1. D ______	LAP 05	21. A ______	LAP 09	41. B ______
	2. C ______		22. C ______		42. D ______
	3. C ______		23. D ______		43. B ______
	4. B ______		24. D ______		44. B ______
	5. D ______		25. B ______		45. A ______
LAP 02	6. C ______	LAP 06	26. A ______	LAP 10	46. A ______
	7. A ______		27. D ______		47. B ______
	8. D ______		28. B ______		48. A ______
	9. A ______		29. D ______		49. C ______
	10. A ______		30. C ______		50. D ______
LAP 03	11. A ______	Unit 01 LAP 07	31. D ______	LAP 11	51. A ______
	12. C ______		32. B ______		52. D ______
	13. A ______		33. D ______		53. A ______
	14. C ______		34. C ______		54. D ______
	15. B ______		35. B ______		55. B ______
LAP 04	16. D ______	LAP 08	36. C ______	LAP 12	56. B ______
	17. B ______		37. A ______		57. D ______
	18. D ______		38. A ______		58. C ______
	19. A ______		39. D ______		59. D ______
	20. C ______		40. A ______		60. D ______

COURSE PRETEST ANSWER KEY: ROUGH-IN

Occupational Area: ______
File Code: 70.01.00.00.A2-2
Name: ______

ANSWERS

Unit 01 LAP 13	61. A ______
	62. A ______
	63. B ______
	64. B ______
	65. D ______
LAP 14	66. B ______
	67. C ______
	68. C ______
	69. C ______
	70. B ______
LAP 15	71. A ______
	72. B ______
	73. B ______
	74. D ______
	75. A ______
LAP 16	76. C ______
	77. D ______
	78. C ______
	79. C ______
	80. D ______
LAP 17	81. B ______
	82. C ______
	83. B ______
	84. D ______
	85. C ______
LAP 18	86. B ______
	87. B ______
	88. B ______
	89. A ______
	90. C ______
Unit 01 LAP 19	91. A ______
	92. B ______
	93. C ______
	94. B ______
	95. A ______
LAP 21	96. B ______
	97. D ______
	98. B ______
	99. A ______
	100. A ______
LAP 22	101. C ______
	102. C ______
	103. A ______
	104. A ______
	105. C ______
LAP 23	106. C ______
	107. B ______
	108. C ______
	109. A ______
	110. A ______
LAP 24	111. C ______
	112. A ______
	113. D ______
	114. B ______
	115. D ______
LAP 25-26	116. C ______
	117. D ______
	118. D ______
	119. B ______
	120. D ______

COURSE PRETEST ANSWER KEY: ROUGH-IN

Occupational Area: ______________________

File Code: 70.01.00.00.A2-2

Name: ______________________

ANSWERS

Unit 01
LAP 27
121. D ______
122. C ______
123. D ______
124. D ______
125. A ______

LAP 28-29
126. C ______
127. B ______
128. D ______
129. A ______
130. A ______

Unit 02
LAP 01
131. D ______
132. C ______
133. C ______
134. B ______
135. D ______

LAP 02
136. B ______
137. A ______
138. C ______
139. C ______
140. C ______

LAP 03
141. C ______
142. A ______
143. B ______
144. C ______
145. A ______

LAP 04-05
146. A ______
147. A ______
148. D ______
149. A ______
150. D ______

Unit 02
LAP 06
151. B ______
152. A ______
153. A ______
154. D ______
155. A ______

LAP 07-08
156. B ______
157. C ______
158. D ______
159. D ______
160. B ______

LAP 09
161. D ______
162. C ______
163. A ______
164. C ______
165. B ______

LAP 10-11
166. B ______
167. D ______
168. A ______
169. D ______
170. B ______

LAP 12
171. D ______
172. A ______
173. C ______
174. A ______
175. A ______

LAP 13
176. D ______
177. C ______
178. D ______
179. A ______
180. A ______

COURSE PRETEST ANSWER KEY: ROUGH-IN

Occupational Area: ____________________

File Code: 70.01.00.00.A2-2

Name: ____________________

ANSWERS

Unit 02 LAP 14	181.	A
	182.	D
	183.	C
	184.	C
	185.	D
LAP 15	186.	C
	187.	D
	188.	C
	189.	D
	190.	B
LAP 17	191.	D
	192.	B
	193.	D
	194.	A
	195.	A
LAP 18	196.	B
	197.	A
	198.	D
	199.	D
	200.	C
LAP 19	201.	D
	202.	C
	203.	C
	204.	C
	205.	B
LAP 20, 21 & 22	206.	A
	207.	B
	208.	B
	209.	A
	210.	C
Unit 02 LAP 23	211.	D
	212.	B
	213.	B
	214.	A
	215.	C
Unit 03 LAP 01	216.	C
	217.	C
	218.	C
	219.	A
	220.	B
LAP 02	221.	C
	222.	D
	223.	B
	224.	B
	225.	C
LAP 03	226.	B
	227.	A
	228.	D
	229.	C
	230.	B
LAP 04	231.	C
	232.	C
	233.	B
	234.	B
	235.	D
LAP 05	236.	C
	237.	B
	238.	D
	239.	D
	240.	C

COURSE PRETEST ANSWER KEY: ROUGH-IN

Occupational Area: ______________________
File Code: 70.01.00.00.A2-2
Name: ______________________

ANSWERS

Unit 03
LAP 06

241. D ______
242. C ______
243. A ______
244. D ______
245. A ______

LAP 07

246. D ______
247. B ______
248. D ______
249. B ______
250. A ______

Unit 04
LAP 01-02

251. B ______
252. C ______
253. D ______
254. B ______
255. B ______

LAP 03

256. D ______
257. A ______
258. B ______
259. B ______
260. D ______

LAP 04

261. D ______
262. A ______
263. C ______
264. B ______
265. A ______

LAP 05

266. C ______
267. C ______
268. A ______
269. C ______
270. C ______

Unit 04
LAP 06

271. D ______
272. D ______
273. A ______
274. D ______
275. A ______

LAP 07

276. D ______
277. C ______
278. D ______
279. C ______
280. B ______

LAP 08

281. C ______
282. D ______
283. D ______
284. D ______
285. C ______

LAP 09

286. C ______
287. D ______
288. A ______
289. C ______
290. D ______

LAP 10

291. B ______
292. C ______
293. B ______
294. A ______
295. A ______

LAP 11

296. C ______
297. D ______
298. D ______
299. A ______
300. C ______

COURSE PRETEST ANSWER KEY: ROUGH-IN

Occupational Area:
File Code: 70.01.00.00.A2-2
Name:

ANSWERS

Unit 04
LAP 12

301. C
302. B
303. B
304. C
305. A

LAP 13

306. A
307. D
308. B
309. A
310. D
311.
312.
313.
314.
315.
316.
317.
318.
319.
320.
321.
322.
323.
324.
325.
326.
327.
328.
329.
330.
331.
332.
333.
334.
335.
336.
337.
338.
339.
340.
341.
342.
343.
344.
345.
346.
347.
348.
349.
350.
351.
352.
353.
354.
355.
356.
357.
358.
359.
360.

Student: ____________ File Code: 70.01.00.00.A2-2

Date: ____________ Date Published: 7/31/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

COURSE POST TEST: ROUGH-IN

70.01.01.01

1. When laying out building lines, the most qualified person to perform the layout of building lines is:

   a. the carpenter.
   b. the owner.
   c. a surveyor.
   d. a civil engineer.

2. It is essential that the carpenter be aware of:

   a. building codes - city.
   b. building codes - state.
   c. building codes - national.
   d. all of the above.

3. When staking out corner stakes for a building site, strings should be attached to the:

   a. stakes.
   b. batter post.
   c. nails on stakes.
   d. nails on batter posts.

4. Before site layout, building sites on rough terrain should be:

   a. finish graded.
   b. rough graded.
   c. leveled.
   d. landscaped.

5. Which of the following should be stored upon starting a building project:

   a. all clay formations.
   b. shrubbery.
   c. existing structure.
   d. top soil.

70.01.01.02

6. In the use of leveling instruments, what replaces the chalkline on straightedge.

   a. instrument.
   b. human.
   c. line of site.
   d. rod.

70.01.01.02 (continued)

7. When comparing the builder's level and the transit level:

   a. both instruments perform the same function.
   b. the transit level is more versatile.
   c. both instruments can move in the vertical plane.
   d. the builder's level is more versatile.

8. To position a transit leveling instrument directly over a given point, which of the following tools is used?

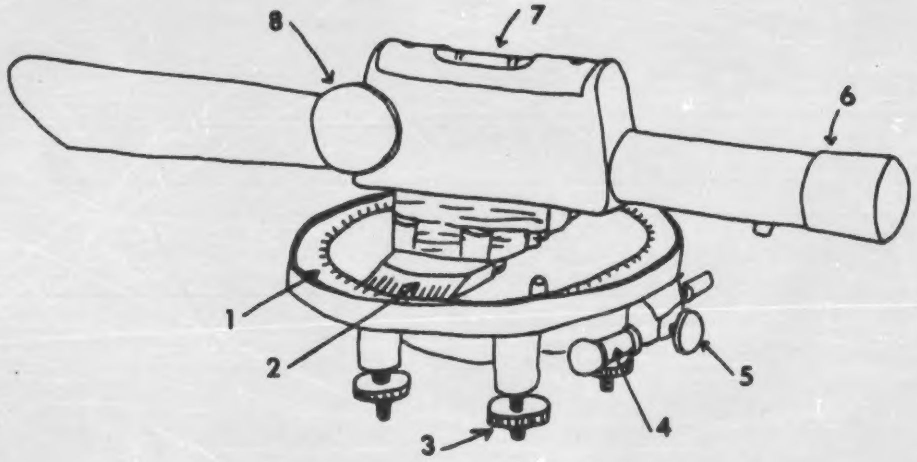
   a. level
   b. straightedge
   c. square
   d. plumb bob

9. A circle is divided into how many degrees.

   a. 360 degrees.
   b. 275 degrees.
   c. 300 degrees.
   d. 220 degrees.

10. In the illustration of the leveling instrument (below), which number would correspond to the focusing knob?

   a. 8
   b. 1
   c. 3
   d. 7



70.01.01.03

11. How much higher is the finish floor than the elevation on the east corner of the house (see plan)?

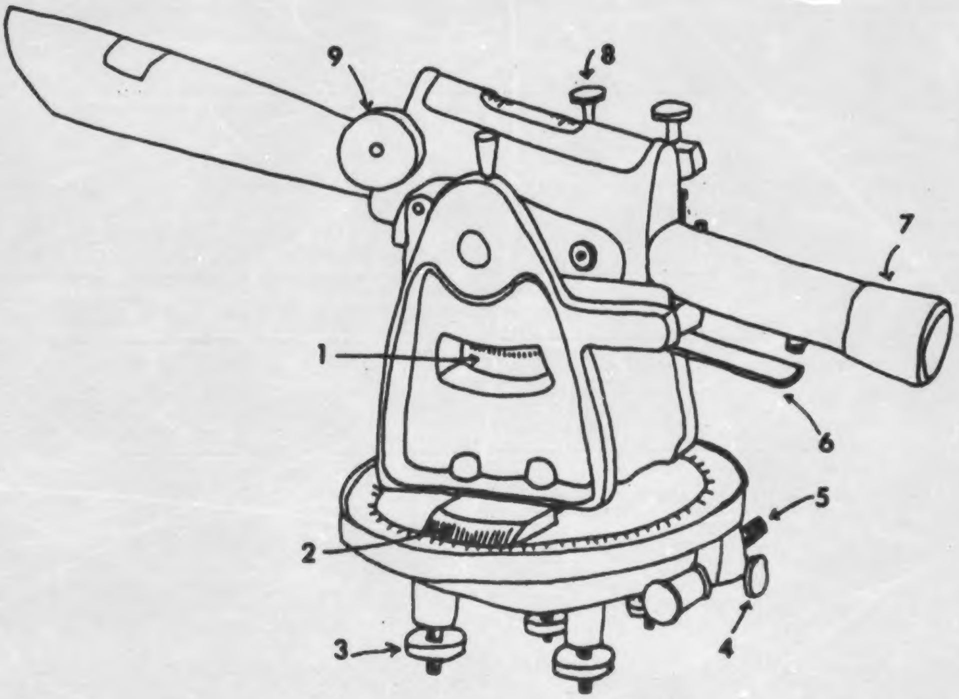
    a. 1'6"
    b. 1'5"
    c. 1"
    d. 2".5"

12. Using the level-transit illustration, which number would identify the leveling screw?

    a. 1
    b. 2
    c. 3
    d. 4

13. Using the level-transit illustration, which number would identify the vertical index pointer?

    a. 1
    b. 2
    c. 3
    d. 4



70.01.01.03 (continued)

14. Using the level-transit illustration on the previous page, which **number** would identify the level lock lever?

a. 8
b. 7
c. 6
d. 9

15. Using the level-transit illustration on the previous page, which **number** would identify the horizontal tangent screw?

a. 2
b. 5
c. 4
d. 3

70.01.01.04

16. Batter boards are used to lay out:

a. wall height.
b. ceiling lines.
c. floor height.
d. footing lines.

17. Better boards should be located **a minimum of how many feet from the building line.**

a. 2
b. 4
c. 1
d. 7

18. Stakes on batter boards should be placed so that:

a. they are oblique to the building.
b. they are in loose soil for easy removal.
c. they are horizontal with building lines.
d. all markings for lay out are between the stakes.

19. What size material is usually used for making the stakes for better boards?

a. 2 x 4
b. 1 x 2
c. 2 x 2
d. 1 x 4

70.01.01.04 (continued)

20. What is the minimum distance batter boards should be located from the building lines?

    a. 1'
    b. 2'
    c. 3'
    d. 4'

70.01.01.05

21. How far down is it from the finish floor level to the bottom of the footing (see plan Section A-A)?

    a. 9'7"
    b. 4"
    c. 8'3'
    d. 12"

22. How far is it from the finish floor level in tenths and hundredths to the finish grade level at the east corner of the house (see plan)?

    a. 1'
    b. 2.5'
    c. 1.5'
    d. 101

23. Which of the following is true concerning the layout of the finish grade on the plot plan. (See plan provided plot)?

    a. lot is level
    b. lot slopes to the SW
    c. lot slopes to the NE
    d. lot slopes to the NW

24. Which of the following areas is not excavated (see plan)?

    a. Rec Room
    b. Workshop
    c. Storage
    d. Stoop (front)

25. How much lower is the top of the stoop foundation than the basement?

    a. 25"
    b. 5"
    c. 2'4"
    d. 5'

70.01.01.06

26. When figuring cubic yards, how many cubic feet are in a cubic yard?

    a. 27
    b. 9
    c. 19
    d. 3

27. A cubic yard of dirt contains how many cubic feet of dirt?

    a. 19
    b. 9
    c. 3
    d. 27

28. How much dirt will be removed from the garage area? (See plan) Do not consider footing and foundation.

    a. 10.7 cubic yards.
    b. no dirt will be removed.
    c. 5.8 cubic yards.
    d. 25.4 cubic yards.

29. What is the depth from the top of the garage foundation to the bottom of the footing (See plan Section C-C)?

    a. 9'1"
    b. 8'1"
    c. 5'4"
    d. 6'

30. What is the width of the garage footing (See plan Section C-C)?

    a. 8"
    b. 12"
    c. 1'8"
    d. 18"

70.01.01.07

31. The standard unit of measure of concrete is the:

    a. cubic inch.
    b. square inch.
    c. cubic foot.
    d. cubic yard.

32. How many cubic feet are in a cubic yard of concrete?

    a. 9
    b. 27
    c. 3
    d. 12

70.01.01.07 (continued)

33. How much concrete will it take to pour a footing 10' long, 1' thick and 1' wide?

    a. 2 yards.
    b. 1/2 cubic yard.
    c. 1 cubic yard.
    d. 1/3 cubic yard.

34. How much concrete will it take to pour a wall 8" thick, 10' long, and 2' high?

    a. 50 cubic yards.
    b. 5 cubic yards.
    c. 5 cubic yards.
    d. 2.5 cubic yards.

35. What is the height of the house foundation wall (See plan Section A-A)?

    a. 8'3"
    b. 8'7"
    c. 8'1'
    d. 8'0"

70.01.01.08

36. Which type of cement has the characteristic of low heat hydration and resistance to sulfate attack?

    a. type III
    b. type I
    c. type II
    d. type IV

37. The characteristics suitable for normal use is:

    a. type I
    b. type II
    c. type III
    d. type IV

38. Of the following types of cement which has the characteristic of severe sulfate resistance?

    a. type V
    b. type IV
    c. type II
    d. type I

70.01.01.08 (continued)

39. Of the following types of cement, which has the characteristic of minimal low heat hydration?

a. type II
b. type V
c. type III
d. type IV

40. Which type of cement should be used if very rapid strength is needed?

a. type III
b. type II
c. type I
d. type IV

70.01.01.09

41. The term referring to the placement of concrete as near to its finished location as possible is:

a. pouring.
b. spotting.
c. finishing.
d. bucking.

42. In using the concrete forms, it is essential that they be adequately:

a. vinyl covered.
b. painted.
c. surfaced.
d. braced.

43. When placing concrete in forms, the layers should be what distance?

a. 2" - 6"
b. 12" - 18"
c. 6" - 10"
d. 2' - 4'

44. When concrete is overworked, it will produce what result?

a. smooth concrete
b. honeycomb
c. a finished product
d. an adequate job

70.01.01.09 (continued)

45. The result caused by too much consolidation is.

   a. water separation
   b. rapid setting
   c. slow setting
   d. hydration.

70.01.01.10

46. The temperature element affects which process in cementation?

   a. hydration
   b. finish
   c. pouring
   d. placement

47. Which type of cement provides high early strength?

   a. type II
   b. type III
   c. type I
   d. type IV

48. An adimixture used to increase setting time is called:

   a. calcuim chloride.
   b. air entrainment.
   c. water.
   d. oil.

49. If aluminum conduit is installed in concrete, what element should not be used?

   a. concrete adimixtures.
   b. air entrainment.
   c. calcium chloride.
   d. concrete coloring.

50. Which of the following is a freeze-preventing chemical?

   a. concrete sulfates.
   b. calcium chloride.
   c. air entrainment.
   d. there are none.

70.01.01.11

51. A chemical action that occurs between water and Portland Cement is called:

   a. hydration.
   b. calcium chlorination.
   c. sulfation.
   d. air entrainment.

70.01.01.11 (continued)

52. What is the minimum number of gallons of water that is required for the process of hydration to occur?

    a. 5 gallons
    b. 1 gallon
    c. 2 gallons
    d. 3 gallons

53. In order for hydration to occur it is necessary to prevent:

    a. evaporation.
    b. high early setting.
    c. sulfation.
    d. air entrainment.

54. Proper curing of concrete for 7 days will increase concrete strength by approximately what percentage?

    a. 30%
    b. 10%
    c. 20%
    d. 50%

55. Twenty-eight days of moist curing concrete will do what to the strength of the concrete.

    a. triple it
    b. double it
    c. quadruple it
    d. lessen it

70.01.01.12

56. A groove formed in a footing to provide a lock between pours is called a:

    a. notch.
    b. keyway.
    c. cold joint.
    d. expansion joint.

57. The ability of concrete to resist twisting is called:

    a. density.
    b. compressive strength.
    c. compression strength.
    d. tensile strength.

70.01.01.12 (continued)

58. In the footing illustration, which number would correspond to the footing width?

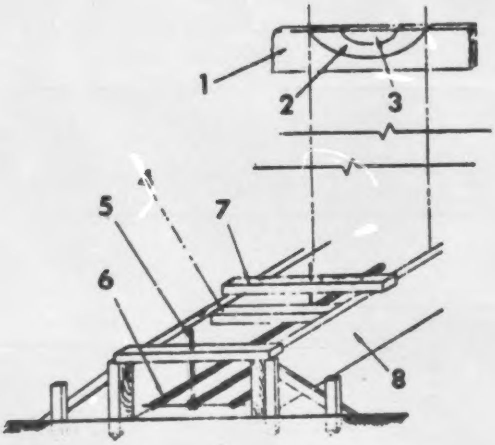
   a. 1
   b. 3
   c. 2
   d. 4

59. In the footing illustration, which number would correspond to the rod holder?

   a. 4
   b. 6
   c. 7
   d. 5

60. In the footing illustration, which number corresponds to the reinforcing steel?

   a. 5
   b. 7
   c. 8
   d. 6



70.01.01.13

61. What is the diameter of the anchor used in the garage foundation (See plan Section C-C)?

   a. 5/8"
   b. 3/8"
   c. 1/2"
   d. 3/4"

70.01.01.13 (continued)

62. Anchor bolts on the garage foundation hold down a structural member. What size is this member (See Section C-C)?

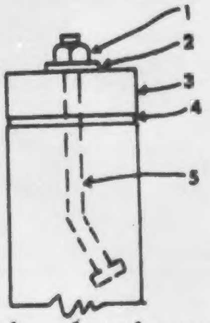
    a. 2 x 4
    b. 4 x 6
    c. 2 x 6
    d. 4 x 4

63. A guide used to accurately drill holes in sill is called:

    a. drill
    b. template
    c. draw knife
    d. drill index

64. In the typical anchor bolt illustration below, which number would correspond to the sill?

    a. 4
    b. 3
    c. 5
    d. 1



65. How many anchor bolts should be placed near the corners of a foundation?

    a. 4
    b. 2
    c. 3
    d. 1

70.01.01.14

66. How many yards of concrete will a wall 20' x 3' x 8" require:

    a. 2.75 yards.
    b. 1.48 yards.
    c. 3.0 yards.
    d. 5.6 yards.

67. Approximately how many yards of concrete will be required for a footing 30' x 16" x 8"?

    a. .5 yards.
    b. 1.7 yards.
    c. 1.0 yards.
    d. 3.5 yards.

70.01.01.14 (continued)

68. How much concrete would be required for a wall 150' x 8' x 1' and footing 150' x 16" x 1"?

    a. 48.2 yards.
    b. 60.4 yards.
    c. 51.1 yards.
    d. 39.6 yards.

69. How much concrete would be needed for a wall 25' x 2' x 6" and footing 25' x 1' x 6"?

    a. 3.7 yards.
    b. .5 yards.
    c. 1.4 yards.
    d. 8.2 yards.

70. How many cubic feet are in a cubic yard of concrete?

    a. 9
    b. 27
    c. 3
    d. 12

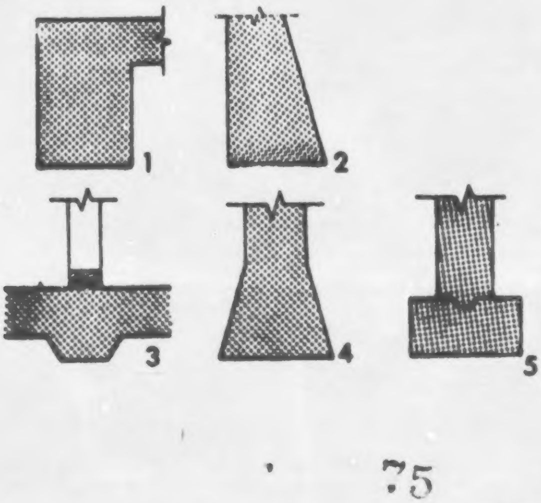
70.01.01.15

71. Which one of the following numbers would correspond to a monolithic foundation? Use the illustration below of types of foundations.

    a. 1
    b. 2
    c. 3
    d. 4

72. Which one of the following numbers would correspond to a boating wall foundation? Use the illustration of types of foundation.

    a. 4
    b. 3
    c. 5
    d. 1



TYPES OF FOUNDATIONS

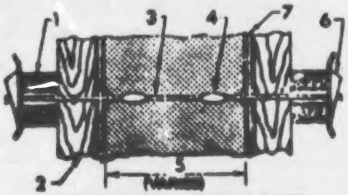
70.01.01.15 (continued)

73. Using the Form Assembly (Wedge-Type) illustration, which number corresponds to the stud of the Form Assembly?

a. 33
b. 2
c. 4
d. 5

74. Using the Form Assembly (Wedge-Type) illustration, which number corresponds to the Form of the Form Assembly?

a. 3
b. 1
c. 2
d. 7



FORM ASSEMBLY (WEDGE-TYPE)

75. The nails used with forms to set foundation are generally:

a. duplex head.
b. galvanized box.
c. finish.
d. barbed.

70.01.01.16

76. To install the beam pocket, it is most common to work from:

a. center pocket to edge beam.
b. edge beam to center pocket.
c. center beam to center pocket.
d. edge pocket to center beam.

77. Where should the headpiece be placed, when framing the opening buck?

a. dado into side pieces.
b. into side pieces.
c. cleated into side pieces.
d. over side pieces.

78. In the illustration of the opening back, the number that corresponds to how cleats should be installed on header pieces is which of the following?

a. 4
b. 3
c. 2
d. 1

70.01.01.16 (continued)

79. How far should the nail cleats on leader pieces be back from the leader end on opening backs?

    a. the thickness of the side pieces.
    b. the thickness of the wall.
    c. the thickness of the side pieces.
    d. the thickness of rough opening.

80. On the opening back illustration, the number that shows position of nail cleats is which of the following?

    a. 1
    b. 4
    c. 5
    d. 3

70.01.01.17

81. Reinforcement steel increases concrete color.

    a. compressive color
    b. tensile color
    c. lead color
    d. variance color

82. Which of the following concrete strengths has the ability to stop from being pulled apart?

    a. load
    b. compressive.
    c. tensile.
    d. variance.

83. The most common reinforcement material used in concrete is made of:

    a. copper.
    b. steel.
    c. aluminum.
    d. brass.

84. Large diameter reinforcement bars have which of the following characteristics?

    a. semi-smooth surfaces.
    b. smooth.
    c. oblique surfaces.
    d. lugs.

85. How is steel usually placed on round structures?

    a. near the middle.
    b. near the middle towards the inside.
    c. near the middle towards the outside.
    d. near the inside edge.

70.01.01.18

86. How much concrete would be needed for a wall 25' x 2' x 6" and footing 25' x 1' x 6"?

    a. .5 yards
    b. 1.4 yards
    c. 3.7 yards
    d. 8.2 yards

87. What is the thickness of the house footing (See plan Section A-A)?

    a. 10"
    b. 1'
    c. 2'
    d. 6"

88. What is the thickness of the house foundation wall (See plan Section A-A)?

    a. 8"
    b. 12"
    c. 10"
    d. 14"

89. When ordering concrete the aggregate size cannot exceed what fraction of the minimum thickness of the member.

    a. 1/2
    b. 3/4
    c. 1/4
    d. 5/8

90. The term referring to the amount of concrete made with one sack of cement is:

    a. 1/2 cubic yard.
    b. one cubic yard.
    c. yield.
    d. volume

70.01.01.19

91. What is the minimum number of gallons of water that is required for the process of hydration to occur.

    a. 3 gallons.
    b. 1 gallon
    c. 2 gallons.
    d. 5 gallons.

70.01.01.19

92. Twenty-eight days of moist curing concrete will do what to the strength of the concrete.

    a. triple.
    b. double.
    c. quadruple.
    d. lessen.

93. Mist spraying of curing concrete is referred to as which type of curing?

    a. climatic
    b. stern
    c. water
    d. atmospheric

94. Curing concrete with wet burlap is which type of curing?

    a. steam/vapor
    b. water retaining
    c. climatic
    d. atmospheric

95. The average period of time required for general curing of concrete is:

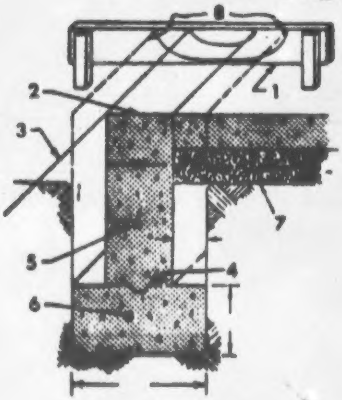
    a. up to one week.
    b. up to one day.
    c. up to one month.
    d. up to two weeks.

70.01.01.21

96. In the illustration of the foundation and slab, which number would correspond to/or identify the footing line?

    a. 1
    b. 8
    c. 2
    d. 3

Foundation and slab



97. In the illustration of the foundation and slab, which number would correspond to/or identify the footing reinforcing rod? (See illustration in #96).

    a. 1
    b. 7
    c. 8
    d. 6

98. In the illustration of the foundation and slab, which number would correspond to or identify the wall reinforcing rod? (See page 17, question #96)

a. 6
b. 5
c. 7
d. 8

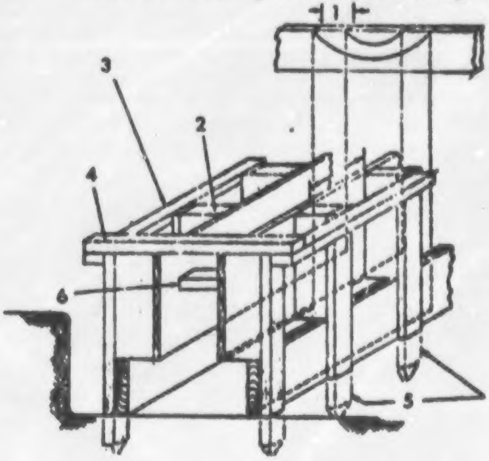
99. In the illustration of the foundation and slab, which number would correspond to or identify the foundation? (See page 17, question #96)

a. 2
b. 5
c. 6
d. 7

100. In the illustration of the square footing wall assembly, which number would correspond to waler?

a. 3
b. 4
c. 5
d. 1

Square footing wall assembly

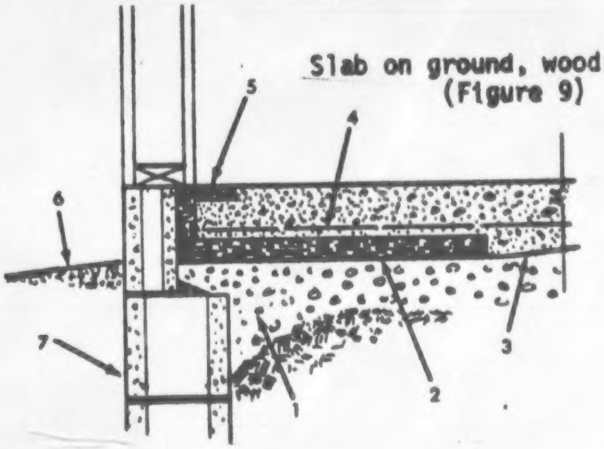


70.01.01.22

101. Using the illustration (Figure #9), (slab-on-ground/wood frame), which number corresponds to the rigid insulation?

a. 4
b. 3
c. 2
d. 5

Slab on ground, wood frame
(Figure 9)



102. Using the illustration in number 101, (Figure #9), (slab-on-ground/wood frame), which number corresponds to the membrane dampproofing?

a. 5
b. 4
c. 3

70.01.01.22 (continued)

103. Using the illustration on page 18, number 101, (Figure #9), (slab-on-ground/wood frame), which number corresponds to the tack strip?

a. 5
b. 6
c. 1
d. 2

104. Using the illustration on page 18, number 101, (Figure #9), (slab-on-ground/wood frame), which number corresponds to the metal reinforcement?

a. 4
b. 5
c. 6
d. 1

105. Using the illustration on page 18, number 101, (Figure #9), (slab-on-ground/wood frame), which number corresponds to the concrete block?

a. 3
b. 4
c. 7
d. 6

70.01.01.23

106. If the steps are more than 3' wide when constructing concrete steps, what is the minimum thickness of the risers?

a. 3/4"
b. 1'
c. 2"
d. 3"

107. The bottom edge of step riser forms are:

a. square.
b. beveled.
c. round.
d. dadoed.

108. In Figure #10, (steps between existing walls), which number corresponds to the basement floor?

a. 1
b. 2
c. 3
d. 4

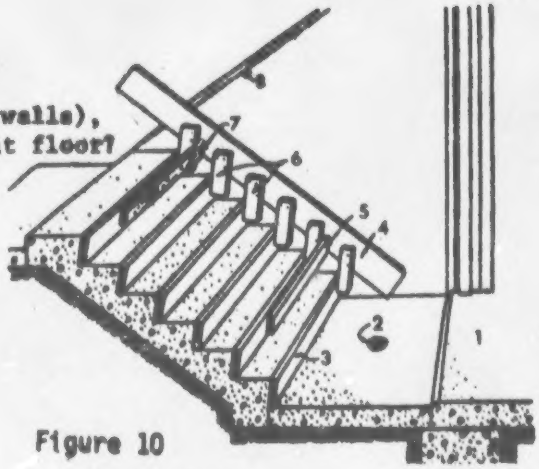


Figure 10

70.01.01.23 (continued)

109. In Figure #10, (steps between existing walls), (refer to page 19, #108), which number corresponds to the riser supports?

  a. 6
  b. 7
  c. 8
  d. 1

110. In Figure #10, (steps between existing walls), (refer to page 19, #108), which number corresponds to the concrete sidewall?

  a. 8
  b. 1
  c. 2
  d. 3

70.01.01.24

111. Concrete screeds are usually supported by:

  a. concrete.
  b. rocks.
  c. stakes.
  d. bricks.

112. Concrete screeds are used to perform which of the following functions?

  a. level concrete.
  b. plumb concrete.
  c. place concrete vertically.
  d. place concrete perpendicular.

113. If the tops of screeds are set to the top of concrete, which of the following must be done by the mason?

  a. re-establish the concrete grade.
  b. level slab to bottom instead.
  c. use a mechanical vibrator.
  d. remove screeds and fill void.

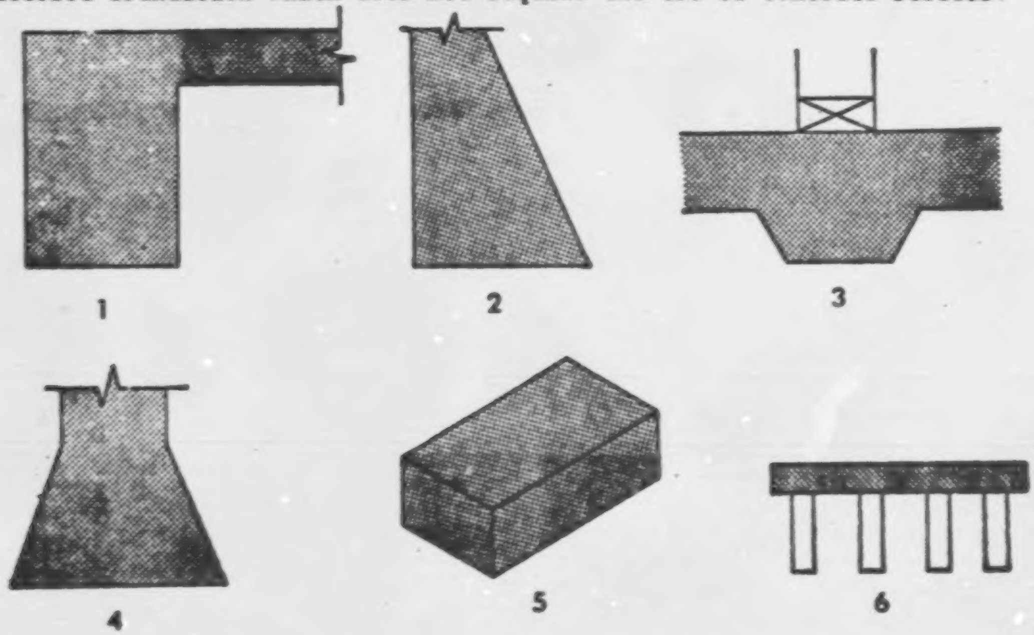
114. If reinforcement bars are used to join slabs, they must:

  a. be installed after concrete takes its set.
  b. protrude through the slab forms.
  c. be lugged bars.
  d. be smooth bars.

70.01.01.24 (continued)

115. In the illustration below (TYPES OF FOUNDATIONS), which number corresponds to a battered foundation which does not require the use of concrete screeds?

a. 5
b. 3
c. 4
d. 2



COMMON TYPES OF FOUNDATIONS

70.01.01.25 &
70.01.01.26

116. In the illustrations of concrete tools, which figure would correspond to a tool that is used for final hand finishing?

a. Figure 44
b. Figure 45
c. Figure 47
d. Figure 40

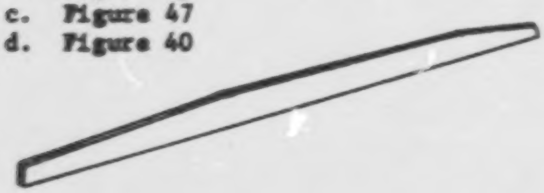


Fig. 36.

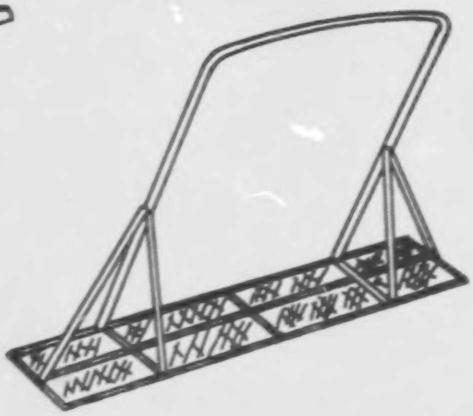


Fig. 38

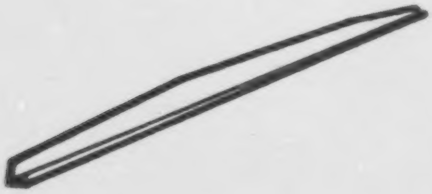


Fig. 37

70.01.01.25 & 70.01.01.26 (continued)

THE FOLLOWING FIGURES ARE ILLUSTRATIONS OF CONCRETE TOOLS USED IN QUESTIONS 116 through 120.

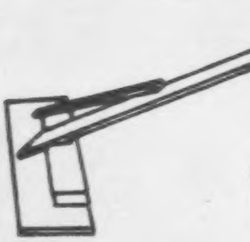


Fig. 40.

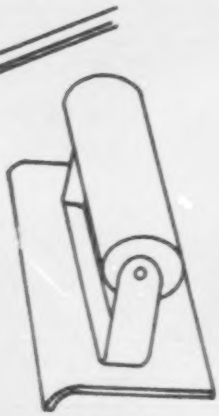


Fig. 41.

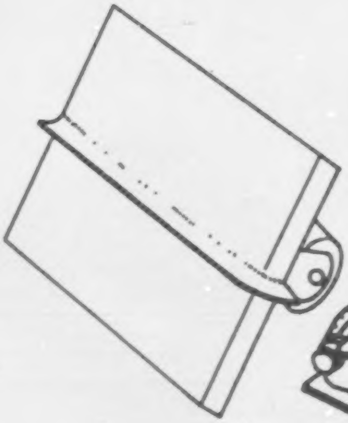


Fig. 42.

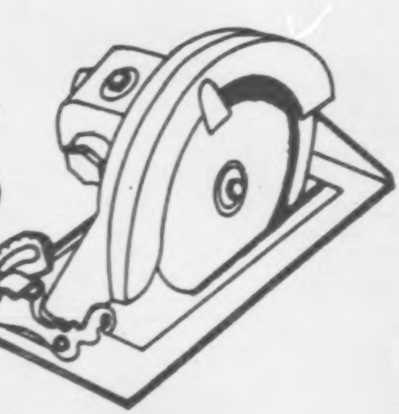


Fig. 43.

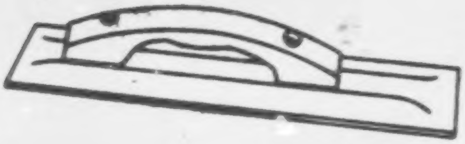


Fig. 44. Metal

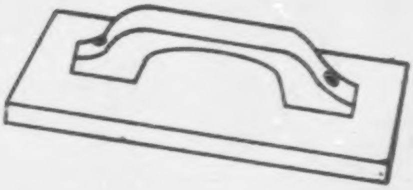


Fig. 45. Wood

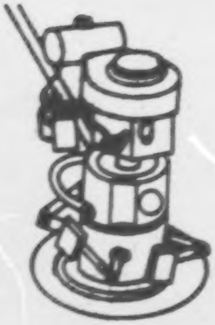


Fig. 46.

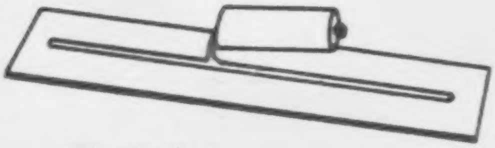


Fig. 47. Steel

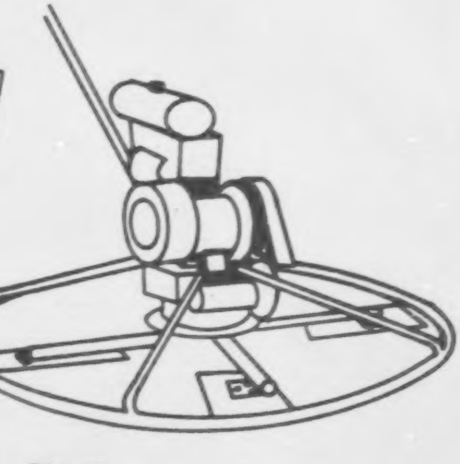


Fig. 48.

117. In the illustrations of concrete tools (pages 21 & 22), which figure would correspond to a tool that is used for edging plastic concrete?

a. Figure 37
b. Figure 42
c. Figure 36
d. Figure 41

118. In the illustrations of concrete tools, (pages 21 & 22), which figure corresponds to a tool that is used for power finishing?

a. Figure 45
b. Figure 46
c. Figure 43
d. Figure 48

119. In the illustrations of concrete tools, (pages 21 & 22), which figure corresponds to a tool that is used for bull floating?

a. Figure 44
b. Figure 40
c. Figure 45
d. Figure 47

120. In the illustrations of concrete tools, which figure corresponds to a tool that is used for floating just prior to troweling? (See pages 21 & 22).

a. Figure 40
b. Figure 43
c. Figure 47
d. Figure 44

70.01.01.27

121. A construction joint is commonly called a(n):

a. dumpy joint.
b. expansion joint.
c. expansive joint.
d. control joint.

122. A slang name for a construction joint is:

a. expansive joint.
b. expansion joint.
c. dumpy joint.
d. control joint.

123. What type of joint is used when a slab abuts a rigid object?

a. construction joint.
b. control joint.
c. dumpy joint.
d. expansion joint.

70.01.01.27 (continued)

124. Control joints in slabs must be placed a maximum of how many feet.

a. 15
b. 10
c. 12
d. 25

125. Construction joints should be laid out in what type of pattern if possible?

a. square.
b. round.
c. rectangular.
d. triangular.

70.01.01.28 &
70.01.01.29

126. Which of the following concrete strengths has the ability to stop from being pulled apart?

a. compressive.
b. tensile.
c. load.
d. variance.

127. Larger diameter reinforcement bars have which of the following characteristics?

a. semi-smooth surfaces.
b. smooth.
c. oblique surfaces
d. lugs.

128. Where is the reinforcement steel placed in a beam?

a. near the lower side.
b. near the upper side.
c. near the middle.
d. on the upper portion just past the middle.

129. How is steel usually placed on round structures?

a. near the middle towards the outside.
b. near the middle towards the inside.
c. near the middle.
d. near the inside edge.

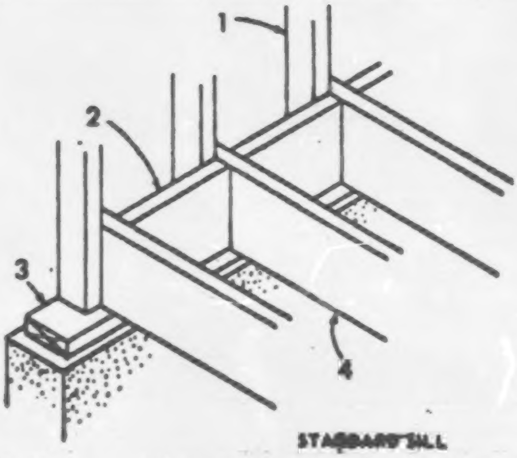
130. What is the minimum recommended amount of concrete coverage of steel in footing?

a. 3"
b. 2"
c. 1"
d. 4"

70.0..02.01

131. On the standard sill illustration below, which number would correspond to the fire stripping?

a. 4
b. 1
c. 3
d. 2



STANDARD SILL

132. On the standard sill illustration (question #131), which number would correspond to the mud sill?

a. 4
b. 1
c. 3
d. 2

133. On the standard sill illustration (question #131), which number would correspond to the stud?

a. 1
b. 3
c. 2
d. 4

134. The member that lies flat on the foundation of a house is called a(n):

a. box sill.
b. mud sill.
c. header.
d. apron.

135. Which of these statements refers to the floor joist?

a. it is the member used to provide rough openings.
b. it boxes the end of structural members.
c. it is the last outside joist.
d. it supports floor from mud sill to girder.

70.01.02.02

136. Mud sills are fastened to foundations with:

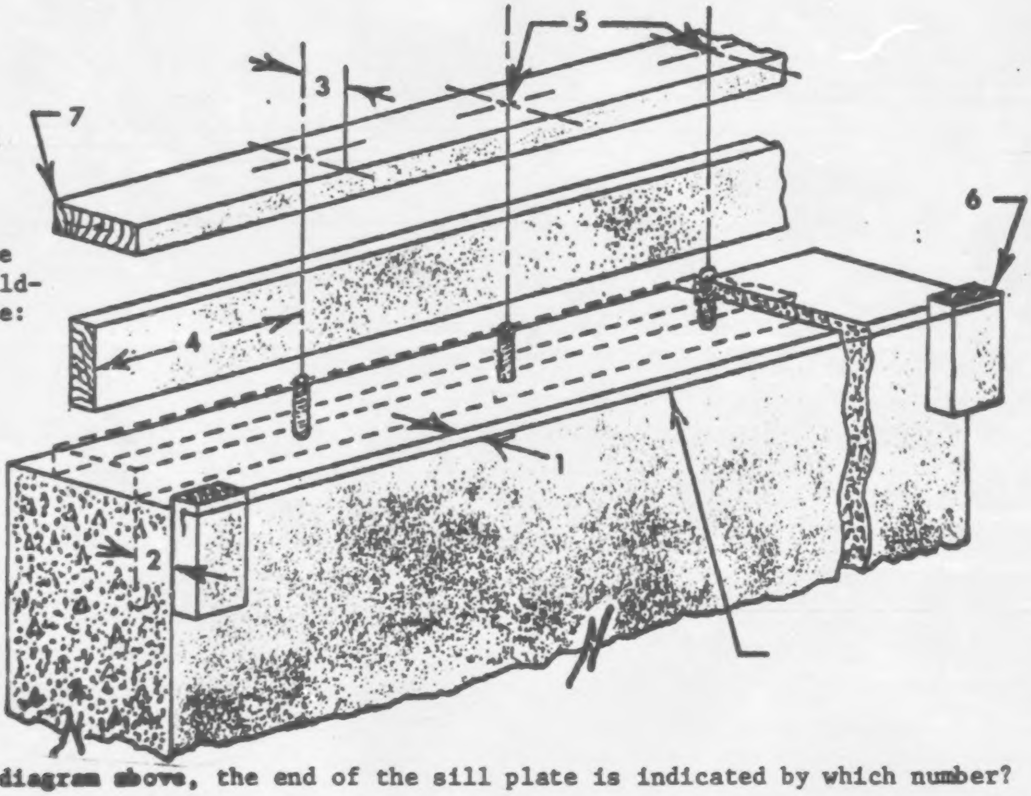
   a. nails.
   b. anchor bolts.
   c. grout.
   d. screws.

137. Anchor bolts should be placed approximately how far from the corners of foundations:

   a. on the corner
   b. 6'
   c. 1'
   d. 2'

138. In the diagram below, which point would be the building line:

   a. 1
   b. 3
   c. 2
   d. 5



139. In the diagram above, the end of the sill plate is indicated by which number?

   a. 4
   b. 1
   c. 7
   d. 5

140. In the diagram above, the first step necessary, when marking bolt center requires the plate to be:

   a. flat.
   b. inclined.
   c. on edge.
   d. level.

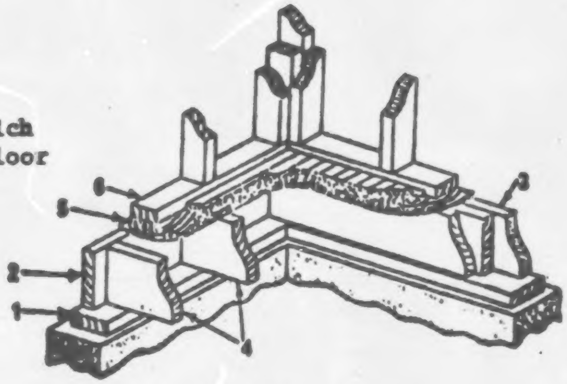
70.01.02.03

141. When laying out the box sill for floor joists, what is the usual first measurement to the first joist from the car of the box sill if joists are considered 2" nominal dimension and joists are on 24" o.c.?

a. 23 3/4
b. 22 1/2
c. 23 1/4"
d. 24"

142. In the box sill illustration, which number would correspond to the floor joist?

a. 4
b. 1
c. 2
d. 3



BOX SILL

143. How many joists are required under partitions running parallel with the floor joist?

a. 1
b. 2
c. 3
d. 4

144. What size are the joists in the bedroom (see plan)?

a. 2 x 6
b. 2 x 8
c. 2 x 10
d. 2 x 4

145. What is the length of the floor joist over the living room (see plan)?

a. 16'
b. 14'
c. 12'
d. 18'

70.01.02.04 &
70.01.02.05

146. What size girder is used in the living room over the basement (see plan)?

a. 8 x 10
b. 8 x 12
c. 6 x 10
d. 8 x 14

70.01.02.04 & 70.01.02.05 (continued)

147. What type of girder is the one that supports the living room floor?

a. flush (clear span)
b. beam/post
c. clear span steel
d. clear span iron

148. Approximately how long is the beam or girder that supports the living room (see plan)?

a. 16'
b. 10'
c. 14'
d. 12'

149. What size is the girder in the garage area (see plan)?

a. 6 x 8
b. 6 x 10
c. 2 x 6
d. 2 x 8

150. What size material would be used to construct the beam or girder in the garage (see plan)?

a. 2 x 12
b. 2 x 6
c. 2 x 10
d. 2 x 8

70.01.02.06

151. When floor joists are turned on edge and sighted, the curved surface is commonly called:

a. hump.
b. crown.
c. bevel.
d. salvage.

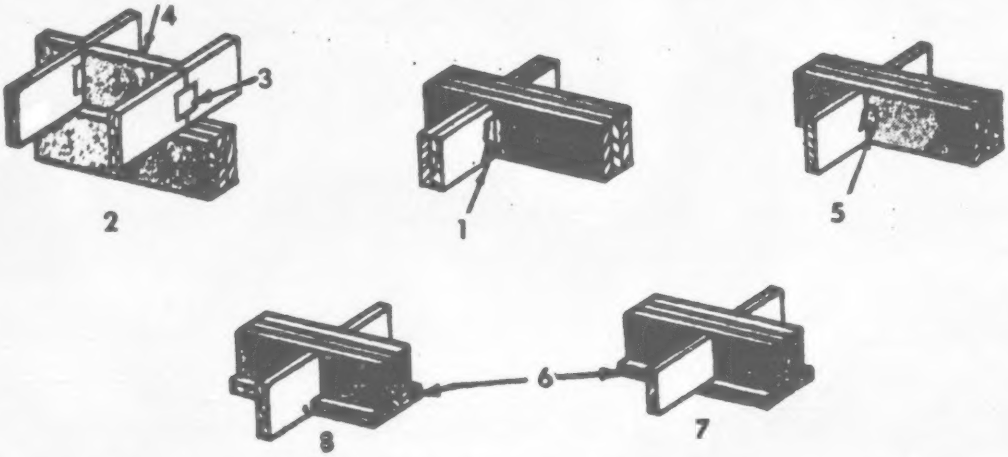
152. A fire cut joist has which of the following types of cut?

a. inclined.
b. square.
c. plumb.
d. perpendicular.

70.01.02.06 (continued)

153. In the illustration below (Figure #15), which number would correspond to the in line joist illustration?

a. 2
b. 1
c. 8
d. 7

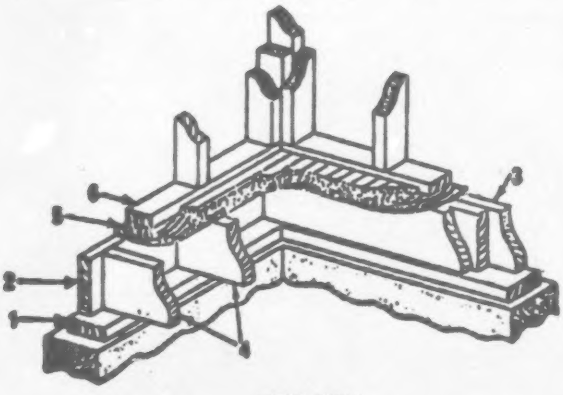


154. In the illustration above (Figure #15), which number would correspond to the ledger supported joist illustration without notch?

a. 7
b. 8
c. 1
d. 5

155. In the box sill illustration below, which number would correspond to the floor joist?

a. 4
b. 3
c. 1
d. 2



BOX SILL

70.01.02.07 &
70.01.02.08

156. When cross bridging is installed, how is the weight distributed if a man is standing on only one joist?

a. on one joist
b. on several joists
c. on two joists
d. it is not distributed

70.01.02.07 & 70.01.02.08 continued

157. Bridging is required if joist span is over what distance?

a. 12'
b. 10'
c. 8'
d. 13'

158. What degree of cut is necessary when the ends of bridging are on the flat plane (across the face)?

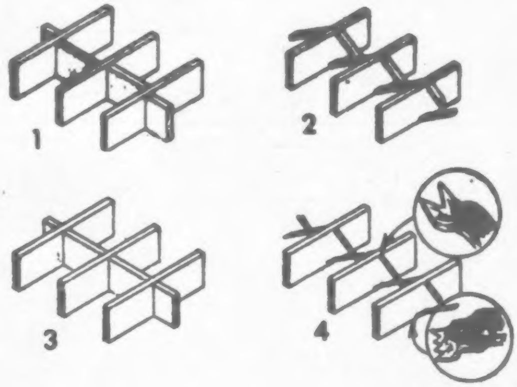
a. 75 degrees
b. 45 degrees
c. 33.3 degrees
d. 90 degrees

159. In the illustration below of the types of bridging, which number would correspond to wood cross bridging?

a. 1
b. 3
c. 4
d. 2

160. In the illustration below of the types of bridging, which number would correspond to solid bridging in line?

a. 1
b. 3
c. 2
d. 4



TYPES OF BRIDGING

70.01.02.09

161. How are tail joists positioned in relation to the centers of the floor joist?

a. not placed on the same center.
b. on alternate layout centers.
c. on opposite layout centers.
d. on the same layout centers.

70.01.02.09 (continued)

162. In the illustration below, (Figure 18), the member(s) labeled "Number 2" is/are called which of the following?

a. floor joist.
b. tail joist.
c. leaders.
d. joist.

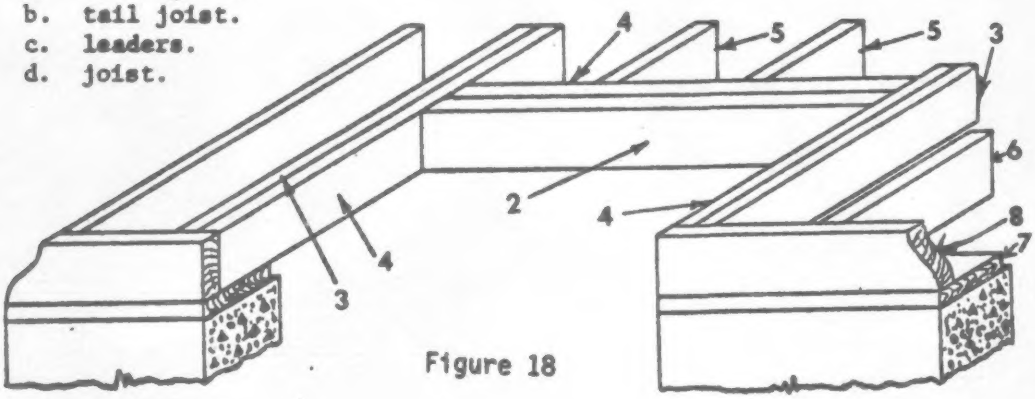


Figure 18

163. In the illustration above, (Figure 18), the member(s) labeled "Number 5" is/are called which of the following?

a. cripple (tail) joist.
b. header joist.
c. rim joist.
d. box sill.

164. In the illustration above, (Figure 18), the member(s) labeled "Number 4" is/are called which of the following?

a. rim joist.
b. headers.
c. floor joist (trimmer)
d. box sill.

165. In the illustration above, (Figure 18), of a stairwell opening, which Number would correspond to the first member(s) to be installed when making a stairwell?

a. 1
b. 4
c. 2
d. 3

70.01.02.10 &
70.01.02.11

166. If the width of subflooring boards is less than six inches, how many nails are required in each board?

a. 3
b. 2
c. 4
d. 5

167. The minimum thickness of plywood allowed by the FHA standards on joists 16" o.c. is:

a. 3/8" CD Shop
b. 1/2" CD Shop
c. 5/8" CD X
d. 1/2" CD X

168. The nails on the edges of the plywood should be nailed less than how many inches apart?

a. 6"
b. 8"
c. 10"
d. 12"

169. The nails on the center portion of plywood should be nailed less than how many inches apart?

a. 12"
b. 6"
c. 10"
d. 8"

170. What size of nail is recommended when installing plywood subfloor?

a. 10d box.
b. 8d box.
c. 6d box.
d. 12d box.

70.01.02.12

171. When joists are doubled for additional support:

a. the O.C. spacing is increased.
b. the length of the bridging is not changed.
c. the plywood subfloor cannot be used.
d. none of the above.

70.01.02.12 (continued)

172. Approximately how many feet of box sill and rim joist will the house require (see plan)?

a. 190"
b. 275'
c. 150'
d. 350'

173. What is the dimension of the box sill and rim joist (see plan)?

a. 2 x 12
b. 2 x 8
c. 2 x 10
d. 2 x 6

174. Approximately how many lineal feet of sill plate will be required for the garage area? (see plan)

a. 70'
b. 74'
c. 90'
d. 24'

175. What size are the floor joists in the bedroom area?

a. 2 x 10
b. 2 x 12
c. 2 x 8
d. 2 x 6

70.01.02.13

176. In Figure 19 on the following page, which number would correspond to the cripple studs?

a. 1
b. 9
c. 10
d. 8

177. In Figure 19 on the following page, which number would correspond to the double header?

a. 6
b. 7
c. 4
d. 9

178. In Figure 19 on the following page, which number would correspond to the broken plate joists?

a. 11
b. 10
c. 6
d. 3

70.01.02.13 (continued)

179. In Figure 19, below, which number would correspond to the top double plate?

a. 1
b. 9
c. 10
d. 11

180. In Figure 19, below, which number would correspond to the door rough opening?

a. 6
b. 5
c. 4
d. 11

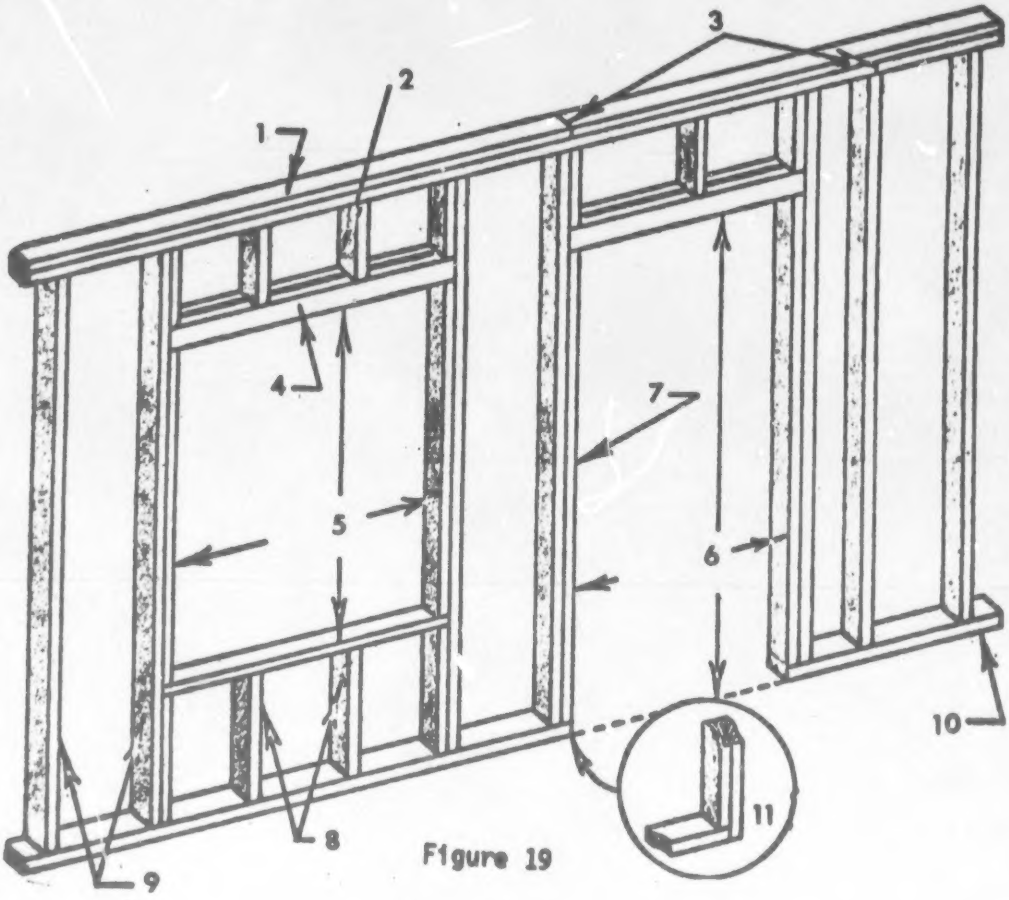


Figure 19

70.01.02.14

181. Using the table below, what size header would be required for doors lettered M in the house plan (see plan)?

a. 2 x 4
b. 2 x 6
c. 2 x 8
d. 2 x 10

HEADER SPANS

Material on Edge	Supporting one floor, ceiling, roof	Supporting only ceiling and roof
2 x 4	3' - 0"	3' - 6"
2 x 6	5' - 0"	6' - 0"
2 x 8	7' - 0"	8' - 0"
2 x 10	8' - 0"	10' - 0"
2 x 12	9' - 0"	12' - 0"

70.01.02.14 (continued)

182. Using the table on header spans on **page 34**, question #181, what size header would be required for openings labeled letter N in the house (see plan)?

a. 2 x 10
b. 2 x 6
c. 2 x 8
d. 2 x 4

183. Using the table on header spans on **page 34**, question #181, what size header would be required for openings labeled letter Q in the house (see plan)?

a. 2 x 8
b. 2 x 6
c. 2 x 4
d. 2 x 10

184. Using the table on header spans on **page 34**, question #181, what size header would be required for doors lettered A in the house plan (see plan)?

a. 2 x 8
b. 2 x 6
c. 2 x 4
d. 2 x 10

185. Using the table on header spans on **page 34**, question #181, what size header would be required for openings labeled letter L in the house plan (see plan)?

a. 2 x 6
b. 2 x 10
c. 2 x 12
d. 2 x 8

70.01.02.15

186. In the plan provided, where on the floor plan are the dimensions measured?

a. from center to center
b. from center of stud.
c. from the outside edge of studs.
d. from inside edge.

187. When determining the length of a header, how many member thicknesses must be added to the R.O. size?

a. four.
b. one.
c. three.
d. two.

70.01.02.15 (continued)

188. The members that support the headers in a wall section are called:

a. sills.
b. studs.
c. trimmers.
d. plates.

189. What is the height to the headers measured from the finished floor in the wall section (see plan)?

a. 6' 8½"
b. 6' 8"
c. 6' 10½"
d. 6' 9½"

190. Allowing 1" to square the window in the rough opening, what length are the headers in the living room of the house (see plan) SW elevation?

a. 10' 9"
b. 11'
c. 10' 10"
d. 11' 1"

70.01.02.17

191. In relation to the outside of the structure to the interior partition location, where are most layouts of plates measured?

a. from inside edge to center.
b. from center to center.
c. from center to inside edge.
d. from outside to center.

192. What is the total width of the bathroom partition measured from NE center to SW center? (see plan)

a. 10' 9"
b. 8' 10"
c. 17' 4"
d. 12' 9"

193. How deep is the bathroom from the outside wall to the inside partition that has a door in it?

a. 8' 0"
b. 10' 4"
c. 10' ½"
d. 10' 2¼"

194. How wide is the living room center to center (see plan)?

a. 14' 10½"
b. 14' 7"
c. 14' 9"
d. 14' 8"

70.01.02.17 (continued)

195. How long is the living room outside to center of the inside partition. (see plan)

a. 23' 3"
b. 23' 4½"
c. 24' 2"
d. 25' 7"

70.01.02.18

196. When considering intersecing partitions, the top plate that runs into the outside wall must be:

a. cut flush with the bottom plate.
b. extended over the bottom plate.
c. cut back from the bottom plate.
d. extended ½ the thickness of the wall.

197. A trussed opening in a wall frame section:

a. distributes the weight to the studs and trimmers.
b. replaces the double header.
c. eliminates a center support in the opening.
d. provides an additional nailing surface.

198. The header sill in a 10'-0" width rough opening window sill is doubled to:

a. provide additional support for the finish window sill.
b. keep from using solid stock.
c. make the dwarf wall section rigid and keep it in line for the finished window.
d. strengthen the top wall plate.

199. Fire blocking is required when:

a. the wall is under 8'6"
b. the wall is over 8'0"
c. the wall is under 8'0"
d. the wall is over 9'0"

200. What is the minimum length the top plate should be from lower top plate splices?

a. 2'
b. 3'
c. 4'
d. 5'

70.01.02.19

201. What is the spacing of the studs in the house plan?

a. 18" o.c.
b. 12" o.c.
c. 20" o.c.
d. 16" o.c.

202. What is the standard pre-cut stud length?

a. 90"
b. 91½"
c. 92½"
d. 90½"

203. The most effective saw to use when cutting dimension lumber to length is the:

a. skill saw.
b. table saw.
c. radial saw.
d. hand saw.

204. A member that runs from plate to sill in a wall section is called a:

a. stud.
b. trimmer.
c. cripple.
d. header.

205. A member that is supported by trimmers in a wall section is a:

a. cripple.
b. header.
c. stud.
d. sill.

70.01.02.20
70.01.02.21
70.01.02.22

206. In two story structures, the exterior wall studs extend from the sill plate to the double top plate in:

a. balloon framing.
b. post and beam framing.
c. western framing.
d. modern braced framing.

70.01.02.20
70.01.02.21
70.01.02.22 (continued)

207. The ledger used for second floor joists in balloon framing:

a. is let-in to the studs.
b. all answers; a, c, and d.
c. serves to mark the rough ceiling height.
d. is placed level.

208. The most common fastening methods used by the carpenters are:

a. gluing and nailing.
b. toe nailing and face nailing.
c. toe nailing.
d. face nailing.

209. A face nail makes the strongest joist when:

a. driven below the surface of the wood.
b. the shank is not ringed.
c. the pull (withdrawal) is with the load.
d. the load is at 90 degrees to the driven nail.

210. Diagonal let-in braces used in exterior walls are:

a. set to brace the wall in both directions.
b. placed at a 60 degree angle.
c. are usually placed after the wall is plumb and in place.
d. set on the inside surface of the stud wall.

70.01.02.23

211. How many trimmer studs will be needed in the SE wall section of the house (see plan)?

a. four
b. eight
c. two
d. six

212. Approximately how many cripple studs will be needed in the SE wall section of the house (see plan)?

a. 2
b. 10
c. 5
d. 6

70.01.02.23 (continued)

213. If the window sill plates are double in the SE wall section, how many lineal feet of plate will be needed for the window sills in the SE sall section? (see plan)

a. 15'
b. 30'
c. 17'
d. 24'

214. The partition studs in the SE wall will require how many full length studs (see plan)?

a. four
b. two
c. seven
d. eight

215. How many partition stud assemblies are there in the SE wall of the house (see plan)?

a. three
b. one
c. two
d. four

70.01.03.01

216. What size are the joists over the dining room area? (see plan)

a. 2" x 6"
b. 2" x 10"
c. 2" x 8"
d. 2" x 12"

217. What size should the on center spacing be for the ceiling joists in the bedroom/bath area of the house? (see plan)

a. 24" o.c.
b. 12" o.c.
c. 16" o.c.
d. 32" o.c.

218. What length of ceiling joists is required for the back bedroom? (see plan)

a. 16'
b. 12'
c. 14'
d. 10'

70.01.03.01 (continued)

219. By using the accompanying Plan Sheet, one can assess that the ceiling joist material for the living room must be:

a. 16' in length.
b. 14' in length.
c. 12' in length.
d. 18' in length.

220. In which direction do the ceiling joists run? (see plan)

a. with the length.
b. across the width.
c. from exterior wall to exterior wall.
d. from beam to exterior wall.

70.01.03.02

221. Which of the following statements is true for the placement of ceiling joists?

a. they are usually smaller than 2" x 4" stock.
b. they are usually placed in between rafters.
c. they are usually placed the same as rafters.
d. they are usually 18" on center.

222. Ceiling joists are usually installed in such a manner as to span:

a. from corner to corner.
b. the longest distance.
c. from the outside wall to the outside wall.
d. the shortest distance.

223. Which of the following on center spacing dimension is not commonly used in ceiling frame construction?

a. 12" o.c.
b. 18" o.c.
c. 16" o.c.
d. 24" o.c.

224. Which number refers to an illustration of a ceiling joist layout that requires partition backing? (see figure 15 on page 29)

a. 4
b. 1
c. 2
d. 3

225. Which number refers to the height left above the plate on a ceiling joist? (see figure 15 on page 29)

a. 6
b. 4
c. 3
d. 1

70.01.03.03

226. **In Figure #21 below, which number identifies the end view of a ceiling backing?**

a. 2
b. 1
c. 3
d. 4

227. **In Figure #21 below, which number corresponds to the illustration of an intersecting partition?**

a. 6
b. 2
c. 3
d. 4

228. **In Figure #21 below, which number corresponds to the tail cut of a typical ceiling joist?**

a. 3
b. 1
c. 2
d. 7

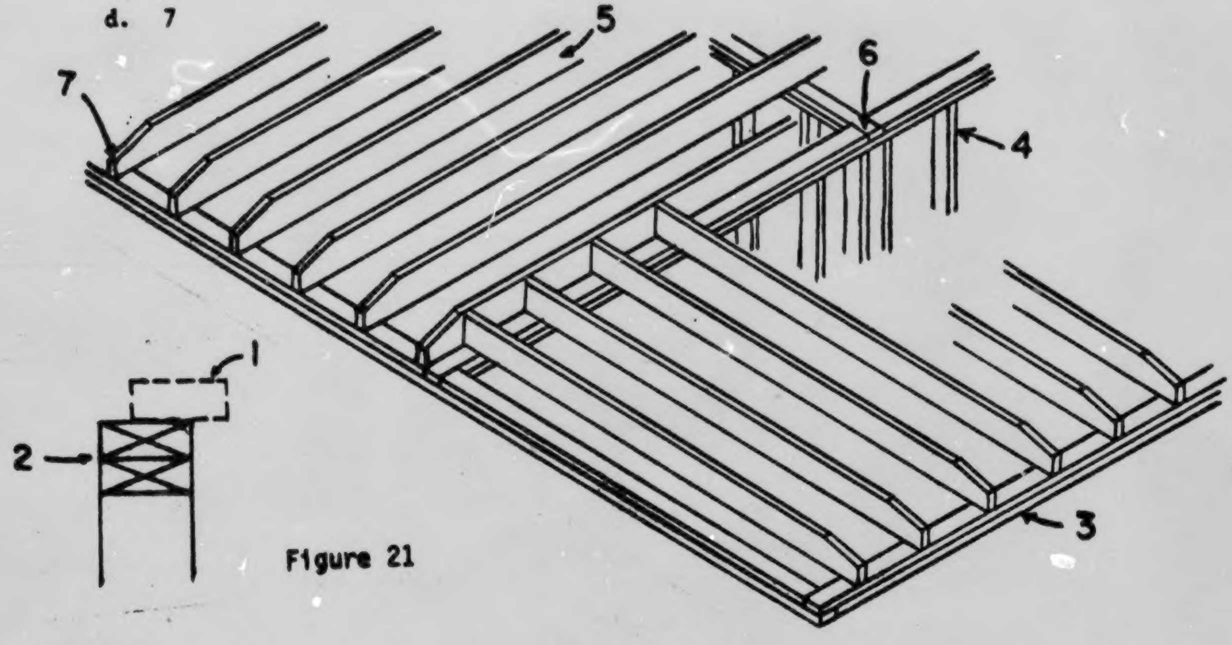


Figure 21

229. Which of the following will be required at the outside edges of a structure, if the ceiling joists run 90 degrees to the roof fafters?

a. herringbone installation
b. bridging.
c. stub ceiling joists.
d. waynes coat installation.

70.01.03.03 (continued)

230. **In Figure #22 below, which number illustrates the height of the roof rafter off the top plate?**

a. 1
b. 3
c. 2
d. 4

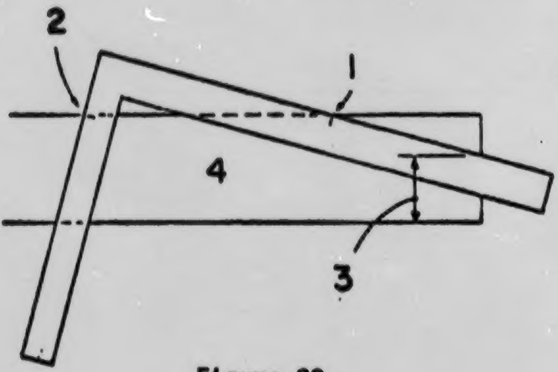


Figure 22

70.01.03.04

231. Ceiling backing is used for which of the following purposes?

a. to provide fire resistance.
b. to brace the top portions of partitions.
c. to provide a nailing surface for ceiling coverings.
d. to provide a nailing surface for insulation.

232. Which of the following is placed on the top of a partition that runs parallel with the ceiling joists?

a. headers.
b. fire blocking.
c. backing.
d. cripples.

233. If a 2" x 6" wide partition is running with the ceiling joists, what is the minimum size backing member that should be used?

a. 2" x 4"
b. 2" x 8"
c. 2" x 6"
d. 2" x 10"

234. Which of the following best describes the position of backing members in relation to ceiling joists?

a. the bottom of the backing is above the bottom of the ceiling joists.
b. the bottoms of both members are level with each other.
c. the bottom of the backing is below the bottom of the ceiling joists.
d. the bottom of the backing is flush with the top of the ceiling joists.

70.01.03.04 (continued)

235. What is the minimum length that backing should overlap the edges of a partition?

a. 3/8"
b. 1/8"
c. 1/4"
d. 3/4"

70.01.03.05

236. Access openings are generally installed in the ceiling of:

a. bedrooms.
b. living rooms.
c. passage ways.
d. kitchens.

237. Access openings are generally installed in the ceiling of:

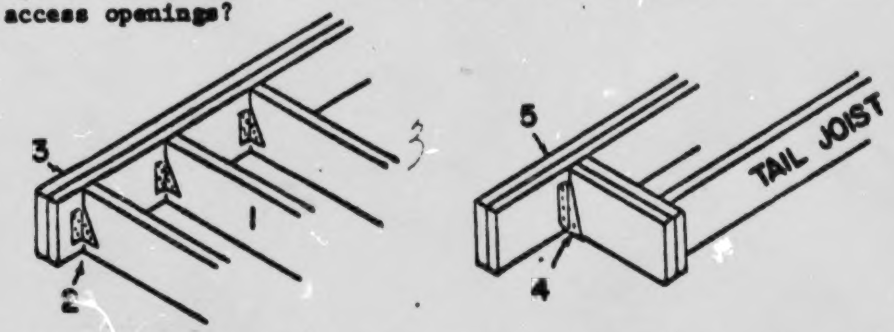
a. living rooms.
b. closets.
c. bedrooms.
d. kitchens.

238. If an access opening requires a ceiling joist to be cut, how many members must be installed to support the cut ceiling joist?

a. 4
b. 1
c. 3
d. 2

239. In the figure below, which number identifies a joist hanger that is often used in access openings?

a. 3
b. 2
c. 4
d. 5



240. In the figure above, question 239, which of the following numbers identifies a typical double trimmer in a ceiling access opening? Remember that the direction of the tail joist must be kept in mind.

a. 1
b. 3
c. 5
d. 2

70.01.03.06

241. A ledger strip provides:

a. rigidity for rafter studs.
b. strength for the support beam.
c. support for the bearing partitions.
d. additional support for the ceiling joists when connected to the support beam.

242. Which of the following support beams is most commonly used in residential housing?

a. an "I" beam.
b. solid.
c. laminated.
d. a "H" beam.

243. When additional support is needed in securing ceiling joists to the support beam, one should use:

a. a ledger strip.
b. heavy twine.
c. electrician's tape.
d. epoxy.

244. Which of the following methods is most commonly used for securing ceiling joists to a support beam?

a. ring shank nailing.
b. flush nailing.
c. lag bolting.
d. toenailing.

245. Item "2" in the illustration provided on the following page, is a:

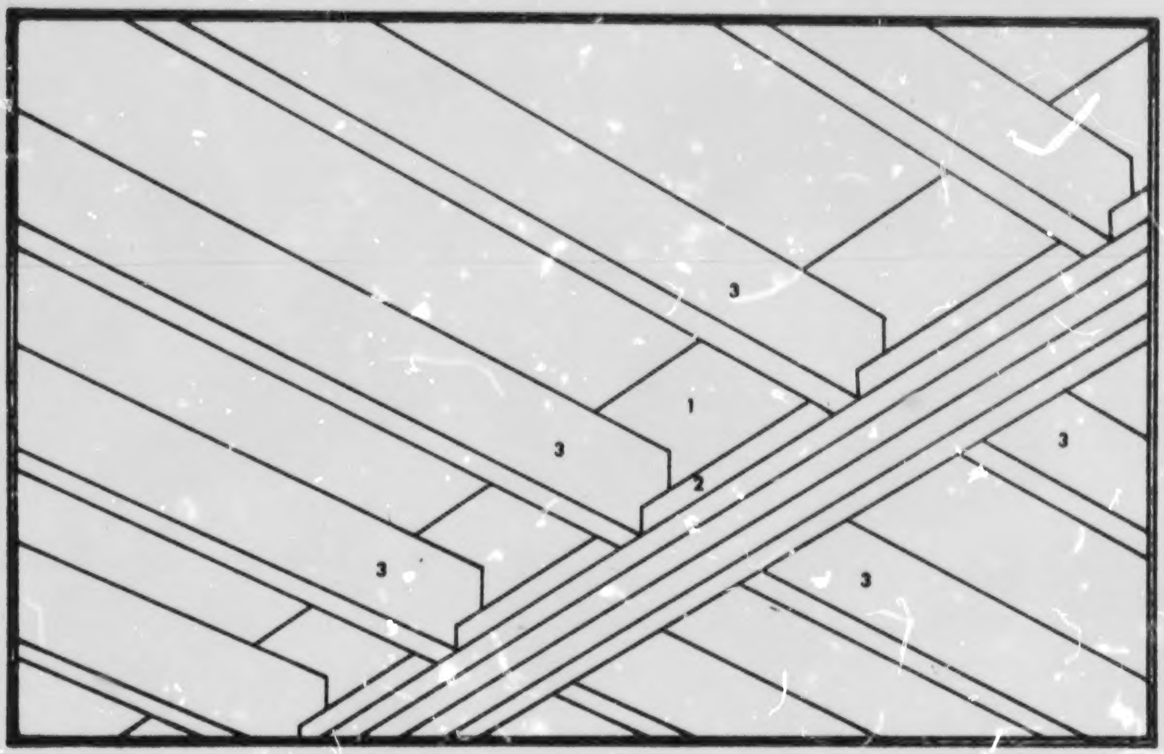
a. ledger strip.
b. support beam.
c. spacer block.
d. rafter stud.

70.01.03.07

246. The first step in installing a strong back is to:

a. tie ceiling joists and strong back together.
b. place blocks on wall plates.
c. place strongback on center line and nail to blocks.
d. align ceiling joists with stay lath.

70.01.03.06 (illustration for question #245 on page 45):



70.01.03.07 (continued)

247. Which of the following methods should be used to tie the ceiling joists and strong back together?

    a. electrician's tape.
    b. plumber's tape or a 2 x 2
    c. epoxy.
    d. heavy twine.

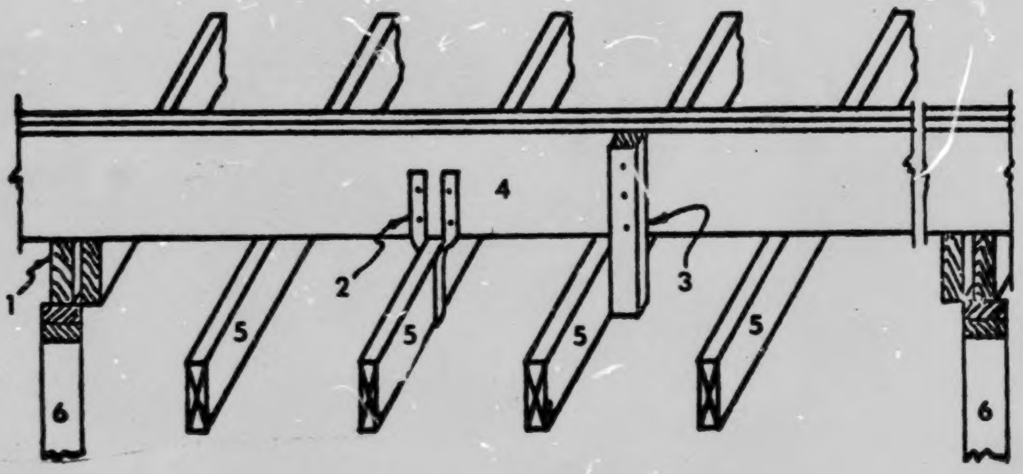
248. Item"1" in the illustration on the following page, is:

    a. a stay lath.
    b. a bearing partition.
    c. a small joist.
    d. a spacer block.

70.01.03.07 (continued)

249. Item "3" in the illustration provided below is used to:

- a. provide alignment for the strong back.
- b. provide support for the ceiling joists.
- c. provide support for the strong back.
- d. keep the two (2) boards that make up the strong back together.



250. In the illustration provided, items "6" (see illustration in above question), are:

- a. bearing partitions.
- b. rafters.
- c. flooring studs.
- d. strong backs.

70.01.04.01 & 70.01.04.02

251. Using Figure #26, identify number "1":

- a. pitch.
- b. rise.
- c. span.
- d. run.

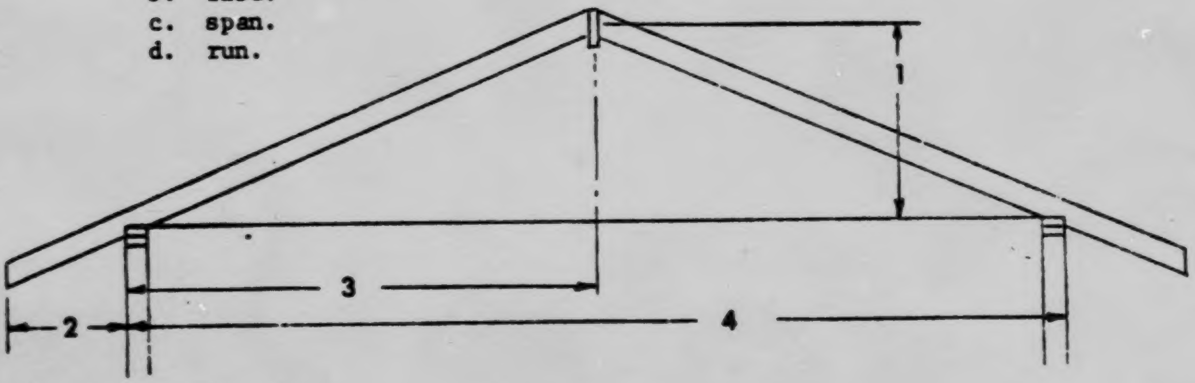


Figure 26

70.01.04.01
70.01.04.02 (continued)

252. Identify number "4" in the Figure provided on page 47, under question #251:

a. plate.
b. run.
c. span.
d. rise.

253. The ratio of the vertical rise to the horizontal run on an incline roof is called the:

a. overhang.
b. rafter length.
c. slope.
d. pitch.

254. The ratio of the vertical rise to the horizontal span on an incline roof is called the:

a. slope.
b. pitch.
c. rafter length.
d. stud.

255. What type of rafter cut is depicted by number "4" in Figure 27?

a. seat.
b. bird's mouth.
c. tail.
d. plumb.

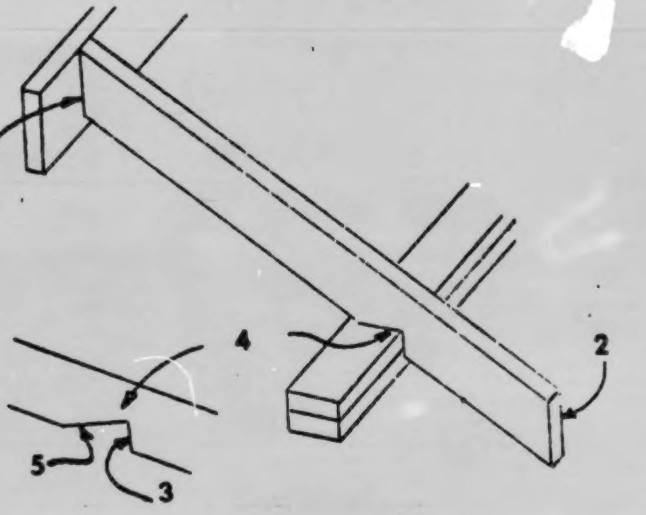


Figure 27

70.01.04.03

256. Which of the following methods can be used to layout a common rafter?

a. plumb method.
b. rule method.
c. tape method.
d. step-off method.

70.01.04.03 (continued)

257. Roof framing is based largely on the properties of the:

a. right triangle.
b. isosceles triangle.
c. scalene triangle.
d. equilateral triangle.

258. If the wall framing is already in place, what addition information is needed by the carpenter to visualize roof framing?

a. the unit run and amount of materials needed.
b. the slope of the roof and the amount of overhang required.
c. the type and amount of materials required.
d. the slope and unit run of the roof.

259. Common rafters can be cut to:

a. only the nearest foot.
b. any length.
c. only the nearest inch.
d. only the nearest millimeter.

260. Which of the following terms indicates the incline of a roof as a ratio of the vertical rise to the span (twice the run)?

a. slant.
b. angle of linearity.
c. slope.
d. pitch.

70.01.04.04

261. Common rafters are installed with the crown side:

a. up
b. to the left.
c. down.
d. to the right.

262. How should rafters be nailed to the rafter plate?

a. supported by small blocks of wood nailed to the rafter plate.
b. two nails driven vertically through both the rafter and rafter plate.
c. toe-nailed on one side.
d. toe-nailed on both sides.

263. Common rafters without an overhang should:

a. overhang the rafter plate by ¼ inch.
b. be ¼ inch from the rafter plate.
c. be flush with the rafter plate.
d. rest exactly on ½ of the rafter plate.

70.01.04.04 (continued)

264. Which of the following methods correctly describes rafter installation procedure?

a. install all the rafters on one side and then all on the other side.
b. install the end rafters and then install the rafters opposite of each other in a random manner.
c. install a rafter on one side and then one on the opposite side directly across from it.
d. install the rafters in any manner just to get them in place.

265. When cutting a common rafter, the craftsman should use a saw equipped with:

a. a cross-cut blade.
b. a straight blade.
c. a ripping blade.
d. any blade that is handy.

70.01.04.05

266. When installing a hip roof, the first pieces of wood cut are the common rafters and the:

a. overhangs.
b. plates.
c. ridge boards.
d. bird's-mouth.

267. An item that must be considered when determining the ridge length of a hip roof is:

a. valley length.
b. the common rafters.
c. twice the run.
d. rafter stock.

268. When two roof surfaces slant upwards from adjoining walls, they meet on a sloping line called a:

a. hip.
b. ridge.
c. common.
d. truss.

269. Which of the following rafters can be used on a hip roof?

a. soffit.
b. stud.
c. jack.
d. facia.

70.01.04.05 (continued)

270. To layout a hip rafter, one should use the same procedure as required for a:

a. joist.
b. ridge.
c. common rafter.
d. plate.

70.01.04.06

271. The principle used in truss design is based on the rigidity of the:

a. polygon.
b. rectangle.
c. square.
d. triangle.

272. A top chord is the same as a:

a. compression web.
b. ceiling joist.
c. tension web.
d. roof rafter.

273. Trusses for residential structures can normally be erected:

a. without special equipment.
b. with an "A" frame.
c. with a small, transportable crane.
d. with the special equipment prescribed.

274. Which of the following is a commonly used roof truss?

a. standard Z.
b. V-type.
c. Johnson-Masterson.
d. Standard W.

275. Which of the following materials should be used for installing truss rafters?

a. glue and nails.
b. nails only.
c. glue only.
d. screws only.

70.01.04.07

276. When installing gable studs, the first procedure is to square a line across the end wall plate below the gable:

a. joist.
b. rise.
c. slope.
d. center.

277. If a ventilator is to be installed in a gable, the carpenter must determine the opening size before placing the first:

a. plate.
b. rafter.
c. stud.
d. ridge.

278. One method of placing the first gable stud is to stand it upright and plumb it with a:

a. steel measuring tape.
b. T-square.
c. framing square.
d. level.

279. A common term for an extended rake is a:

a. rafter.
b. slope.
c. gable overhang.
d. joist.

280. The gable end frame must be completed before completion of the roof:

a. ridge.
b. frame.
c. rake.
d. valley.

70.01.04.08

281. Before applying sheathing to a roof frame, a carpenter should check to see if all the members are:

a. vertical.
b. air tight.
c. secure.
d. moisture resistant.

70.01.04.08 (continued)

282. Another purpose that roof sheathing serves is to:

   a. add weatherproofing.
   b. improve appearance.
   c. provide insulation.
   d. add rigidity.

283. A craftsman should start installing roof sheathing at the:

   a. right side.
   b. peak.
   c. left side.
   d. lower edge.

284. If asphalt or other composition shingles are to be used for roof covering, the shiplap or common board sheathing must be:

   a. applied at every other joist.
   b. applied at random lengths.
   c. spaced evenly.
   d. applied solid.

285. When installing wood shingles, tile, or metal sheets, the sheathing may be spaced according to the:

   a. rise.
   b. span length.
   c. course arrangement.
   d. run.

70.01.04.09

286. One type of underlayment material used to cover roof decks is:

   a. cement.
   b. hot tar.
   c. felt paper.
   d. glass.

287. Heavy felt paper should not be used as an underlayment because:

   a. it is too costly.
   b. it will not accept shingle nails.
   c. it has a messy appearance.
   d. moisture may build up.

288. What is usually installed at the overhang edge of roof sheathing?

   a. metal drip edge.
   b. stud.
   c. ridge.
   d. head lap.

28

70.01.04.09 (continued)

289. General standards for applying underlayment materials is for the toplap of all horizontal joints to:

a. butt edges.
b. be 7" long.
c. be 2" in length.
d. be 12" in length.

290. On each side of the centerline of hips and valleys, underlayment should be lapped at least:

a. 10"
b. 12"
c. 14"
d. 6"

70.01.04.10

291. What is the purpose of shingling a roof?

a. improve appearance.
b. add weatherproofing.
c. provide strength.
d. increase cost.

292. How many times is a roof covered when using interlock shingles?

a. four.
b. one.
c. two.
d. three.

293. What type of exterior surface is used on interlock shingles?

a. rubberized.
b. granulated.
c. impregnated.
d. tar.

294. When laying the first course of shingles, a carpenter must remember to lay it:

a. upside down, face down.
b. right side up, face up.
c. right side down, face up.
d. upside down, face up.

70.01.04.10

295. What might affect putting a new shingle roof on top of an existing old one?

a. the strength of the existing deck.
b. the color of the old roof.
c. the roof slope.
d. the roof rise.

70.01.04.11

296. A major disadvantage in using untreated wood shingles in their low resistance to:

a. wind.
b. hail.
c. fire.
d. dry rot.

297. From which of the following trees are some wood shingles made?

a. oak.
b. pine.
c. aspen.
d. cypress.

298. Wood shingles are manufactured in random widths and in lengths of:

a. 18, 24, and 30 inches.
b. 12, 14, and 16 inches.
c. 8, 10, and 12 inches.
d. 16, 18, and 24 inches.

299. How many layers of wood shingles should a roof have at any given point?

a. three
b. two.
c. one.
d. four.

300. What is the proper number of nails used to attach each wood shingle to the roof?

a. three.
b. one.
c. two.
d. four.

70.01.04.12

301. What is the width of a 3 tab shingle?

a. 14"
b. 10"
c. 12"
d. 16"

302. How many 3 tab shingles are found in a square?

a. 60
b. 80
c. 40
d. 100

303. What size nails should be used for nailing 3 tab shingles to new roofing?

a. 1 3/4"
b. 1 1/4"
c. 2"
d. 1"

304. What size nails should be used for nailing 3 tab shingles over an existing asphalt roof?

a. 1 1/4"
b. 2"
c. 1 3/4"
d. 2 1/4"

305. What type of surface do asphalt shingles have?

a. mineral granules.
b. smooth.
c. rubber.
d. corrugated.

70.01.04.13

306. The on center spacing of the rafters in this structure is:

a. 16" o.c.
b. 12" o.c.
c. 24" o.c.
d. 32" o.c.

307. What type of roof is required by this plan?

a. mansard.
b. gable.
c. gambrel.
d. hip.

70.01.04.13 (continued)

308. In this structural plan, at what angle do the hip rafters run to the facia?

   a. 30 degrees.
   b. 45 degrees.
   c. 15 degrees.
   d. 70 degrees.

309. If a house has a span of 24' and a length of 36' and a standard gable roof, how many roof rafters are required if they are placed 16" o.c.?

   a. 56
   b. 48
   c. 64
   d. 72

310. Given the same house dimensions as in question #309, but with a 2' overhang, what length of roof rafters is needed if the slope is 4/12?

   a. 12'
   b. 14'
   c. 18'
   d. 16'

COURSE POST TEST ANSWER KEY: ROUGH-IN

Occupational Area: COURSE POST TEST: ROUGH-IN
File Code: 70.01.00.00.A2-2
Name:

ANSWERS

Unit 01 LAP 01	1.	D	LAP 05	21.	A	LAP 09	41.	B
	2.	C		22.	C		42.	D
	3.	C		23.	D		43.	B
	4.	B		24.	D		44.	B
	5.	D		25.	B		45.	A
LAP 02	6.	C	LAP 06	26.	A	LAP 10	46.	A
	7.	A		27.	D		47.	B
	8.	D		28.	B		48.	A
	9.	A		29.	D		49.	C
	10.	A		30.	C		50.	D
LAP 03	11.	A	Unit 01 LAP 07	31.	D	LAP 11	51.	A
	12.	C		32.	B		52.	D
	13.	A		33.	D		53.	A
	14.	C		34.	C		54.	D
	15.	B		35.	B		55.	B
LAP 04	16.	D	LAP 08	36.	C	LAP 12	56.	B
	17.	B		37.	A		57.	D
	18.	D		38.	A		58.	C
	19.	A		39.	D		59.	D
	20.	C		40.	A		60.	D

COURSE POST TEST ANSWER KEY: ROUGH-IN

Occupational Area: COURSE POST TEST
File Code: 70.01.00.00.A2-2
Name: ______

ANSWERS

Unit 01
LAP 27

121. D ______
122. C ______
123. D ______
124. D ______
125. A ______

LAP 28-29

126. C ______
127. B ______
128. D ______
129. A ______
130. A ______

Unit 02
LAP 01

131. D ______
132. C ______
133. C ______
134. B ______
135. D ______

LAP 02

136. B ______
137. A ______
138. C ______
139. C ______
140. C ______

LAP 03

141. C ______
142. A ______
143. B ______
144. C ______
145. A ______

LAP 04-05

146. A ______
147. A ______
148. D ______
149. A ______
150. D ______

Unit 02
LAP 06

151. B ______
152. A ______
153. A ______
154. D ______
155. A ______

LAP 07-08

156. B ______
157. C ______
158. D ______
159. D ______
160. B ______

LAP 09

161. D ______
162. C ______
163. A ______
164. C ______
165. B ______

LAP 10-11

166. B ______
167. D ______
168. A ______
169. D ______
170. B ______

LAP 12

171. D ______
172. A ______
173. C ______
174. A ______
175. A ______

LAP 13

176. D ______
177. C ______
178. D ______
179. A ______
180. A ______

COURSE POST TEST ANSWER KEY: ROUGH-IN

Occupational Area: COURSE POST TEST:
File Code: 70.01.00.00.A2-2
Name: ____________

ANSWERS

Unit 02 LAP 14	181. A ______	LAP 19	201. D ______	LAP 02	221. C ______
	182. D ______		202. C ______		222. D ______
	183. C ______		203. C ______		223. B ______
	184. C ______		204. C ______		224. B ______
	185. D ______		205. B ______		225. C ______
LAP 15	186. C ______	LAP 20, 21 & 22	206. A ______	LAP 03	226. B ______
	187. D ______		207. B ______		227. A ______
	188. C ______		208. B ______		228. D ______
	189. D ______		209. A ______		229. C ______
	190. B ______		210. C ______		230. B ______
LAP 17	191. D ______	Unit 02 LAP 23	211. D ______	LAP 04	231. C ______
	192. B ______		212. B ______		232. C ______
	193. D ______		213. B ______		233. B ______
	194. A ______		214. A ______		234. B ______
	195. A ______		215. C ______		235. D ______
LAP 18	196. B ______	Unit 03 LAP 01	216. C ______	LAP 05	236. C ______
	197. A ______		217. C ______		237. B ______
	198. D ______		218. C ______		238. D ______
	199. D ______		219. A ______		239. C ______
	200. C ______		220. B ______		240. C ______

COURSE POST TEST ANSWER KEY: ROUGH-IN

Occupational Area: COURSE POST TEST
File Code: 70.01.00.00.A2-2
Name: ______

ANSWERS

Unit 03
LAP 06

241.D ______
242.C ______
243.A ______
244.D ______
245.A ______

LAP 07

246.D ______
247.B ______
248.D ______
249.B ______
250.A ______

Unit 04
LAP 01-02

251.B ______
252.C ______
253.D ______
254.B ______
255.B ______

LAP 03

256.D ______
257.A ______
258.B ______
259.B ______
260.D ______

LAP 04

261.D ______
262.A ______
263.C ______
264.B ______
265.A ______

LAP 05

266.C ______
267.C ______
268.A ______
269.C ______
270.C ______

Unit 04
LAP 06

271.D ______
272.D ______
273.A ______
274.D ______
275.A ______

LAP 07

276.D ______
277.C ______
278.D ______
279.C ______
280.B ______

LAP 08

281.C ______
282.D ______
283.D ______
284.D ______
285.C ______

LAP 09

286.C ______
287.D ______
288.A ______
289.C ______
290.D ______

LAP 10

291.B ______
292.C ______
293.B ______
294.A ______
295.A ______

LAP 11

296.C ______
297.D ______
298.D ______
299.A ______
300.C ______

COURSE POST TEST ANSWER KEY: ROUGH-IN

Occupational Area: COURSE POST TEST
File Code: 70.01.00.00.A2-2
Name: ______

ANSWERS

Unit 04
LAP 12
301. C ______
302. B ______
303. B ______
304. C ______
305. A ______
LAP 13
306. A ______
307. D ______
308. B ______
309. A ______
310. D ______
311. ______
312. ______
313. ______
314. ______
315. ______
316. ______
317. ______
318. ______
319. ______
320. ______

321. ______
322. ______
323. ______
324. ______
325. ______
326. ______
327. ______
328. ______
329. ______
330. ______
331. ______
332. ______
333. ______
334. ______
335. ______
336. ______
337. ______
338. ______
339. ______
340. ______

341. ______
342. ______
343. ______
344. ______
345. ______
346. ______
347. ______
348. ______
349. ______
350. ______
351. ______
352. ______
353. ______
354. ______
355. ______
356. ______
357. ______
358. ______
359. ______
360. ______

COURSE TEST ANSWER SHEET

Occupational Area: CARPENTRY
File Code: 70.01.00.00.A2-2
Name: ____________
Family Pay Number: ____________ Sex: M F (Circle 1)

ANSWERS

70.01.01.01	1.	C or D	70.01.01.05	21.	D	70.01.01.09	41.	C
	2.	D		22.	B		42.	C
	3.	C		23.	D		43.	B
	4.	B		24.	C		44.	D
	5.	D		25.	B		45.	A
70.01.01.02	6.	C	70.01.01.06	26.	A	70.01.01.10 70.01.01.11	46.	C
	7.	A		27.	D		47.	D
	8.	D		28.	A		48.	A
	9.	A		29.	D		49.	A
	10.	A		30.	B		50.	A
70.01.01.03	11.	A	70.01.01.07	31.	B	70.01.01.12	51.	C
	12.	C		32.	D		52.	C
	13.	A		33.	C		53.	A
	14.	C		34.	D		54.	A
	15.	B		35.	D		55.	C
70.01.01.04	16.	D	70.01.01.08	36.	A	70.01.01.13	56.	C
	17.	A		37.	A		57.	B
	18.	D		38.	B		58.	A
	19.	C		39.	B		59.	A
	20.	B		40.	B		60.	A

COURSE TEST ANSWER SHEET

Occupational Area: CARPENTRY
File Code: 70.01.00.00.A2-2
Name: ____________
Family Pay Number: ____________

Sex: M F (Circle 1)

ANSWERS

70.01.01.14	61.	C	70.01.02.02	81.	B	70.01.02.07 70.01.02.08	101.	B
	62.	A		82.	C		102.	C
	63.	D		83.	C		103.	D
	64.	B		84.	C		104.	D
	65.	D		85.	C		105.	B
0.01.01.15	66.	C	70.01.02.03	86.	C	70.01.02.09	106.	D
	67.	D		87.	A		107.	C
	68.	D		88.	B		108.	A
	69.	B		89.	C		109.	C
	70.	D		90.	A		110.	B
0.01.01.16	71.	D	70.01.02.04 70.01.02.05	91.	A	70.01.02.10 70.01.02.11	111.	B
	72.	C		92.	A		112.	D
	73.	D		93.	D		113.	A
0.01.01.27 (cont.)	74.	D		94.	A		114.	D
	75.	A		95.	D		115.	B
70.01.02.01	76.	D	70.01.02.06	96.	B	70.01.02.12	116.	D
	77.	C		97.	A		117.	A
	78.	A		98.	A		118.	C
	79.	B		99.	A		119.	A
	80.	D		100.	A		120.	A

COURSE TEST ANSWER SHEET

Occupational Area: CARPENTRY
File Code: 70.01.00.00.A2-2
Name: ____________ Sex: M F (Circle 1)
Family Pay Number: ____________

ANSWERS

70.01.02.13	121.	D	70.01.02.18	141.	B	70.01.03.01	161.	C
	122.	C		142.	A		162.	C
	123.	D		143.	A		163.	C
	124.	A		144.	D		164.	A
	125.	A		145.	C		165.	B
0.01.02.14	126.	A	70.01.02.19	146.	D	70.01.03.02	166.	B
	127.	D		147.	C		167.	D
	128.	C		148.	C		168.	B
	129.	C		149.	C		169.	B
	130.	B		150.	B		170.	C
70.01.02.15	131.	C	70.01.02.20 70.01.02.21 70.01.02.22	151.	A	70.01.03.03	171.	B
	132.	D		152.	B		172.	A
	133.	C		153.	B		173.	D
	134.	D		154.	A		174.	C
	135.	B		155.	C		175.	B
70.01.02.17	136.	D	70.01.02.23	156.	D	70.01.03.04	176.	C
	137.	B		157.	B		177.	C
	138.	D		158.	B		178.	B
	139.	A		159.	A		179.	B
	140.	A		160.	C		180.	D

COURSE TEST ANSWER SHEET

Occupational Area: CARPENTRY
File Code: 70.01.00.00.A2-2
Name: ______________________
Family Pay Number: ______________________

Sex: M F (Circle 1)

ANSWERS

70.01.03.05	181.	C	70.01.04.03	201.	D	70.01.04.07	221.	A
	182.	B		202.	A		222.	C
	183.	D		203.	B		223.	D
	184.	C		204.	D		224.	C
	185.	C		205.	D		225.	B
0.01.03.06	186.	D	70.01.04.04	206.	A	70.01.04.08	226.	C
	187.	B		207.	A or D		227.	D
	188.	A		208.	C		228.	D
	189.	D		209.	B		229.	D
	190.	A		210.	A		230.	C
70.01.03.07	191.	D	70.01.04.05	211.	C	70.01.04.09	231.	C
	192.	B		212.	C		232.	D
	193.	D		213.	A		233.	A
	194.	B		214.	C		234.	A
	195.	A		215.	C		235.	D
70.01.04.01 70.01.04.02	196.	B	70.01.04.06	216.	D	70.01.04.10	236.	B
	197.	C		217.	D		237.	C
	198.	C		218.	A		238.	B
	199.	B		219.	D		239.	D
	200.	A or B		220.	A		240.	A

COURSE TEST ANSWER SHEET

Occupational Area: CARPENTRY
File Code: 70.01.00.00.A2-2
Name: Sex: M F (Circle 1)
Family Pay Number:

ANSWERS

70.01.04.11	241.	D	261.		281.	
	242.	D	262.		282.	
	243.	D	263.		283.	
	244.	A	264.		284.	
	245.	C	265.		285.	
0.01.04.12	246.	C	266.		286.	
	247.	B	267.		287.	
	248.	B	268.		288.	
	249.	C	269.		289.	
	250.	A	270.		290.	
0.01.04.13	251.	A	271.		291.	
	252.	D	272.		292.	
	253.	B	273.		293.	
	254.	A	274.		294.	
	255.	D	275.		295.	
	256.		276.		296.	
	257.		277.		297.	
	258.		278.		298.	
	259.		279.		299.	
	260.		280.		300.	

Student: ______________________ File Code: 70.01.01.00. B2-2

Date: ______________________ Date Published: 7/1/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

UNIT POST TEST: EXCAVATION LAYOUT - CONCRETE AND FORMS

70.01.01.01.

1. Good corner stakes should be made of which of the following woods?

   a. pine.
   b. spruce.
   c. hickory.
   d. larch.

2. Which of the following should be stored upon starting a building project?

   a. all clay formations.
   b. shrubs.
   c. existing structure.
   d. top soil.

3. The first step in the process of laying out is to:

   a. set the batter boards.
   b. find the area of the lot.
   c. locate hubs or survey points.
   d. determine setback.

4. A plat of record usually indicates fractional parts of a foot as:

   a. fractions of an inch.
   b. hundredths of a foot.
   c. fractions of a foot.
   d. hundredths of an inch.

5. What size is the lot ? (See Plan)

   a. 100' x 200'
   b. 150' x 200'
   c. 200' x 200'
   d. 90' x 250'

70.01.01.02.

6. The builder's level consists of a telescope assembly that is mounted on a what kind of base.

   a. square.
   b. round.
   c. convex.
   d. circular.

7. A circle is divided into how many degrees.

   a. 360 degrees.
   b. 275 degrees.
   c. 300 degrees.
   d. 220 degrees.

8. In the illustration of the leveling instrument, which number would correspond to the index pointer?

   a. 1
   b. 4
   c. 3
   d. 2

70.01.01.02. continued:

9. In the tripod illustration, **which number would correspond to the clamp?**

   a. 1
   b. 3
   c. 2
   d. 4

10. In the tripod illustration, **which number would correspond to the tie clamp?**

   a. 3
   b. 2
   c. 1
   d. 4

70.01.01.03.

11. Using the level transit illustration, **which number would identify the** vertical index pointer?

    a. 1
    b. 2
    c. 3
    d. 4

12. Using the level transit illustration, **which number would identify the** horizontal clamp screw?

    a. 1
    b. 4
    c. 3
    d. 2

70.01.01.03. continued:

13. Using the level transit illustration, **which number would identify the focusing** knob?

    a. 6
    b. 7
    c. 8
    d. 9

14. Using the level transit illustration, **which number would identify the level** lock lever?

    a. 8
    b. 7
    c. 6
    d. 9

15. Using the level transit illustration, **which number would identify the** horizontal tangent screw?

    a. 2
    b. 5
    c. 4
    d. 3

70.01.01.04.

16. Batter boards are used to:

    a. construct walls.
    b. lay out building lines.
    c. construct ceilings.
    d. construct roofs.

17. Batter boards are used to lay out:

    a. wall height.
    b. ceiling lines.
    c. floor height.
    d. footing lines.

70.01.01.04. continued:

18. When laying out excavation lines using batter boards, the lines should pass directly over:

    a. survey hubs.
    b. layout stakes.
    c. finish grade.
    d. snap ties.

19. Stakes on batter boards should be placed so that:

    a. they are oblique fo the building.
    b. they are in loose soil for easy removal.
    c. they are horizontal with building lines.
    d. all markings for layout are between the stakes.

20. The height of the ledgers should be which of the following in relation to the top of a foundation?

    a. lower than.
    b. a few inches higher.
    c. equal to.
    d. 5' feet more than.

70.01.01.05.

21. How far down is it from the finish floor level to the bottom of the footing? (See plan section A-A)

    a. 9'7"
    b. 4"
    c. 8'3"
    d. 12"

22. How far is it from the finish floor level in tenths and hundredths to the finish grade level at the east corner of the house? (See Plan)

    a. 1'
    b. 2.5'
    c. 1.5'
    d. 10'

70.01.01.05. continued:

23. What is the depth to the bottom of the footing at the flagstone terrace if finish grade is considered to be 94? Note finish floor grade of 102.5 (See Plan).

    a. 1'1"
    b. 9'7"
    c. 8'1"
    d. 8'6"

24. If the front of the house finish grade is considered to be 101 and the back of the house is 94 and the finish floor grade is 102.5, what is the average depth down to the bottom of the footing? (See plot plan)

    a. 4'7"
    b. 1'1"
    c. 8'1"
    d. 9'7"

25. Which of the following areas is not excavated ? (See Plan)

    a. rec room.
    b. workshop.
    c. storage.
    d. stoop (front).

70.01.01.06.

26. How much dirt will be removed from the garage area? (See Plan) Do not consider footing and foundation.

    a. 10.7 cubic yds.
    b. no dirt will be removed.
    c. 5.8 cubic yds.
    d. 25.4 cubic yds.

27. What is the thickness of the garage footing? (See plan section C-C)

    a. 6"
    b. 20"
    c. 12"
    d. 8"

70.01.01.06. Continued:

28. Assuming that the finish grade is to be 1'6" below the top of the garage foundations, the total footing and foundation height is 4', the garage with an unexcavated floor is 24' x 20', and the footing width is 1'8", approximately how much dirt will have to be excavated for a 4 foot trench?

    a. 27.4 cubic yds.
    b. 22.7 cubic yds.
    c. 42.9 cubic yds.
    d. 32.5 cubic yds.

29. Given a plan that indicates the size of a house to be 20' x 30' and the bottom of the footing to be 7', how much earth will have to be removed in order to put in the basement or foundation?

    a. 172.2 yds.
    b. 123.2 yds.
    c. 127.4 yds.
    d. 155.5 yds.

30. Given a plan that indicates the size of a house to be 22'6" x 30' and the bottom of the footing to be 3', how much earth will have to be removed in order to put in the basement or foundation?

    a. 69.2 yds.
    b. 75 yds.
    c. 80.6 yds.
    d. 27.5 yds.

70.01.01.07.

31. Approximately how much concrete will it take to pour the footing on the NW side of the garage? (See Plan)

    a. 1 cubic yd.
    b. 1.5 cubic yds.
    c. 2.2 cubic yds.
    d. .5 cubic yds.

32. Approximately how many yards of concrete will a footing 30' x 16" x 8" require ?

    a. .5 yds.
    b. 1.0 yds.
    c. 1.7 yds.
    d. 3.5 yds.

70.01.01.07. continued:

33. Given a blueprint that states a wall 100' x 4' x 6" and footing 100' x 16" x 10", how many yards of concrete will be necessary for the job?

    a. 9.5 yds.
    b. 10.6 yds.
    c. 15.0 yds.
    d. 11.4 yds.

34. To construct a wall 150' x 8' x 1' and footing 150' x 16" x 1', how many yards of concrete are needed?

    a. 60.4 yds.
    b. 51.1 yds.
    c. 48.2 yds.
    d. 39.6 yds.

35. What is the thickness of the house foundation wall ? (See plan section A-A)

    a. 12"
    b. 10"
    c. 8"
    d. 14"

70.01.01.08.

36. What do the letters ASTM stand for?

    a. American Society of Testing Mechanics.
    b. American Society for Test Materials.
    c. American Society of Thermal Mechanics.
    d. American Society of Technical Mechanics.

37. Which type of cement has the characteristic of low heat hydration and resistance to sulfate attack?

    a. type III
    b. type I
    c. type II
    d. type IV

70.01.01.08. continued:

38. The type of cement which has the characteristic of high-early strength is:

    a. type II
    b. type III
    c. type I
    d. type IV

39. How many different types of cement are classified by ASTM?

    a. one.
    b. three.
    c. five.
    d. seven.

40. A type of cement that has the characteristic of resistance to chemical de-icers would be identified by the letter(s):

    a. II A/E
    b. I A
    c. I A/E
    d. II A/S

70.01.01.09.

41. In using the concrete forms, it is essential that they be adequately:

    a. vinyl covered.
    b. painted.
    c. surfaced.
    d. braced.

42. The scale found on reinforcing steel is often referred to as:

    a. mill scale.
    b. rust scale.
    c. no 7 scale.
    d. variance.

43. To have a result of good concrete it is essential that the concrete be:

    a. poured.
    b. compacted.
    c. leveled.
    d. finished.

70.01.01.09. continued:

44. When concrete is overworked, it will produce what result?

    a. smooth concrete.
    b. honey comb.
    c. a finish product.
    d. an adequate job.

45. **The result caused by too much consolidation is:**

    a. water separation.
    b. rapid setting.
    c. slow setting.
    d. hydration.

70.01.01.10.

46. **At temperatures below what level, there is practically no increase in the strength** of concrete.

    a. 60 degrees.
    b. 40 degrees.
    c. 50 degrees.
    d. 32 degrees.

47. To produce the same characteristic in ordinary cement as high early cement, it is necessary to use:

    a. less aggregate.
    b. less cement.
    c. more cement.
    d. more sand.

48. The reason for steam curing of concrete is to provide:

    a. slower strength.
    b. less strength.
    c. rapid strength.
    d. equal strength.

70.01.01.10. continued:

49. Which of the following is a freeze-preventing chemical?

    a. concrete sulfate.
    b. calcium chloride.
    c. air entrainment.
    d. there are none.

50. One of the advantages of type III cement provides is:

    a. more tensile strength.
    b. long setting time.
    c. poor compressive strength.
    d. short setting time.

70.01.01.11.

51. What is the minimum number of gallons of water per cubic yard that is required for the process of hydration to occur?

    a. 5 gals.
    b. 1 gal.
    c. 2 gals.
    d. 3 gals.

52. In order for hydration to occur it is necessary to prevent:

    a. evaporation.
    b. high early setting.
    c. sulfation.
    d. air entrainment.

53. From 3 to 7 days, what is the minimum temperature for curing?

    a. 40 degrees.
    b. 60 degrees.
    c. 50 degrees.
    d. 35 degrees.

54. What is the minimum number of days recommended for curing concrete?

    a. 1 day.
    b. 7 days.
    c. 2 days.
    d. 3 days.

70.01.01.11. continued:

55. Mist spraying of curing concrete is referred to as:

    a. steam curing.
    b. water curing.
    c. climatic curing.
    d. atmospheric curing.

70.01.01.12.

56. A groove formed in a footing to provide a lock between pours is called a:

    a. notch.
    b. keyway.
    c. cold joint.
    d. expansion joint.

57. In the footing illustration, which number would correspond to the rod holder?

    a. 4
    b. 6
    c. 7
    d. 5

70.01.01.12. continued:

58. In the footing illustration, **which number co-responds to the reinforcing steel?**

    a. 5
    b. 7
    c. 8
    d. 6

59. In the typical footing illustration, **which number would correspond to the wall thickness?**

    a. 1
    b. 2
    c. 4
    d. 3

60. In the typical footing illustration, **which letter would correspond to the form tie?**

    a. 7
    b. 5
    c. 6
    d. 8

70.01.01.13.

61. Anchor bolts on the garage foundation hold down a structural member. What size is this member ? (section C-C)

    a. 2 x 4
    b. 4 x 6
    c. 2 x 6
    d. 4 x 8

62. What size is the structural member which is held in place by anchor bolts on the house foundation? (section A-A)

    a. 2 x 4
    b. 2 x 6
    c. 4 x 6
    d. 4 x 4

70.01.01.13. Continued:

63. What size of anchor bolts is used in the house foundation?

    a. 1/2 x 18
    b. 5/8 x 18
    c. 3/8 x 18
    d. 1/4 x 16

64. In the typical anchor bolt illustration, which number would correspond to the sill?

    a. 4
    b. 3
    c. 5
    d. 1

65. In the typical anchor bolt illustration, which number would correspond to the washer?

    a. 3
    b. 2
    c. 4
    d. 5

70.01.01.14.

66. Given a bluéprint that says you have a wall 100' x 4' x 6" and footing 100' x 16" x 10", how much concrete will it require to do the job?

    a. 9.5 yds.
    b. 10.6 yds.
    c. 11.4 yds.
    d. 15.0 yds.

67. How much concrete would be required for a wall 150' x 8' x 1' and footing 150' x 16" x 1' ?

    a. 48.2 yds.
    b. 60.4 yds.
    c. 51.1 yds.
    d. 39.6 yds.

68. How much concrete will it take to pour the wall on the NW side of the garage? (See Plan)

    a. 27.2 cubic yds.
    b. 272 cubic yds.
    c. 2.72 cubic yds.
    d. .272 cubic yds.

69. What is the height of the house foundation wall ? (See plan section A-A)

    a. 8'3"
    b. 8'7"
    c. 8'1"
    d. 8'0"

70. What is the thickness of the house foundation wall? (See plan section A-A)

    a. 8"
    b. 10"
    c. 14"
    d. 12"

70.01.01.15.

71. **Which one of the following numbers would correspond to a T foundation?** Use the illustration of types of foundations.

    a. 3
    b. 1
    c. 2
    d. 5

70.01.01.15. continued:

72. Using the form assembly (wedge type) illustration, **which number** corresponds to the wall thickness of the form assembly?

    a. 5
    b. 6
    c. 7
    d. 1

73. Using the form assembly (wedge type) illustration, **which number** corresponds to the wedge of the form assembly?

    a. 9
    b. 7
    c. 8
    d. 6

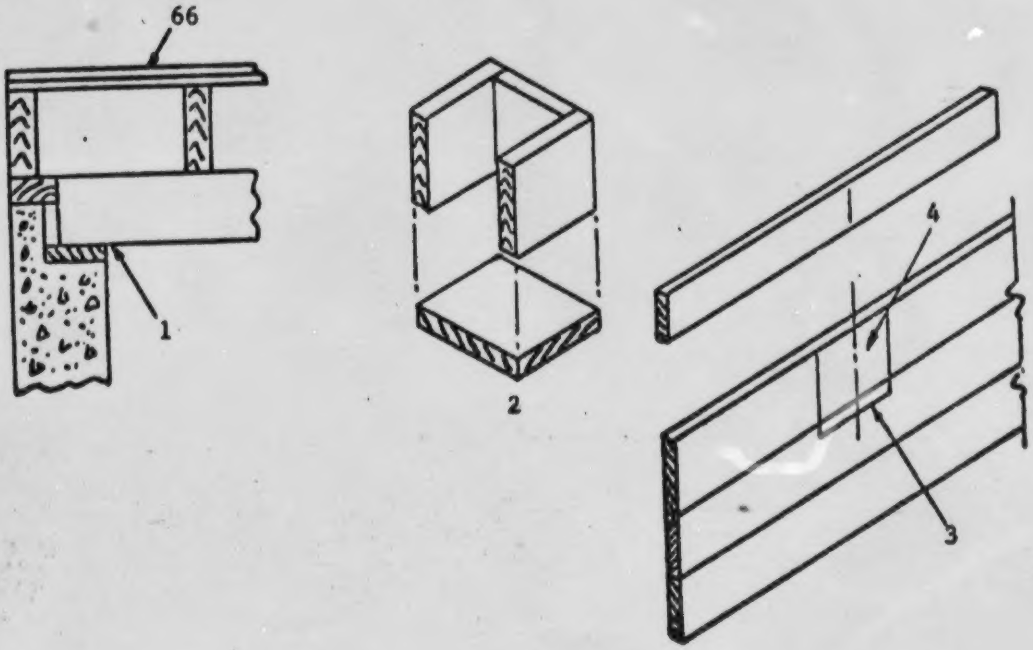
74. Walers can be secured at corners by:

    a. lapping walers and/or using backing boards.
    b. nailing to plyform studs.
    c. tying units to batterboards.
    d. wiring walers to studs.

75. After all the foundation panels are in place, the line and block method can be used for:

    a. measuring form depth.
    b. obtaining overall form length.
    c. establishing F.F. grade.
    d. setting the form to the exact building line.

70.01.01.16.



Beam Pocket

76. In the illustration of the beam pocket, which number would correspond to the pocket form?

a. 2
b. 3
c. 4
d. 1

77. Using the beam pocket illustration, which number would correspond to the center of the beam?

a. 3
b. 4
c. 1
d. 2

70.01.01.16. continued:

78. To install the beam pocket, it is most common to work from:

    a. center pocket to edge beam.
    b. edge beam to center pocket.
    c. center beam to center pocket.
    d. edge pocket to center beam

79. When are opening backs installed?

    a. after concrete is poured .
    b. after inside form is installed.
    c. before inside form is installed.
    d. after walls are straightened.

80. Most opening backs are made of what thickness of material?

    a. 2"
    b. 1 1/2"
    c. 1"
    d. 2 1/2"

70.01.01.17.

81. Another term referring to the concrete-pulling-apart strength is:

    a. compressive strength.
    b. tensile strength.
    c. load strength.
    d. variance strength.

82. Another term referring to the concrete-crushing strength is:

    a. tensile strength.
    b. compressive strength.
    c. load strength.
    d. variance strength.

83. Larger diameter reinforcement bars have which of the following characteristics?

    a. semi-smooth.
    b. smooth.
    c. oblique surfaces.
    d. lugs.

70.01.01.17. continued:

84. What is the recommended minimum amount of concrete coverage of steel in slabs?

    a. 1"
    b. 3/4"
    c. 1 1/2"
    d. 2"

85. When reinforcement bars are spliced, what is the minimum recommended lap?

    a. 2'
    b. 1'
    c. 1 1/2'
    d. 19"

70.01.01.18.

87. How much concrete will it take to pour the wall on the NW side of the garage, approx. (See Plan) ?

    a. 27.2 cubic yds.
    b. 272 cubic yds.
    c. 2.72 cubic yds.
    d. .272 cubic yds.

88. How much concrete would be needed for a wall 25' x 2' x 6" and footing 25' x 1' x 6" ?

    a. .5 yds.
    b. 1.4 yds.
    c. 3.7 yds.
    d. 8.2 yds.

89. The maximum slump allowable for reinforced foundation walls is:

    a. 4"
    b. 1"
    c. 3"
    d. 2"

70.01.01.18. continued:

90. The maximum slump allowable for non-reinforced slabs is:

    a. 3"
    b. 2"
    c. 1"
    d. 4"

70.01.01.19.

91. What is the minimum number of gallons of water that is required for the process of hydration to occur ?

    a. 3 gals.
    b. 1 gal.
    c. 2 gals.
    d. 5 gals.

92. Proper curing of concrete for 7 days will increase concrete strength by approximately what percentage?

    a. 20%
    b. 10%
    c. 50%
    d. 30%

93. Curing concrete with a chemical membrane uses which curing principle?

    a. water evaporation.
    b. water retaining.
    c. water resistant.
    d. water atmospheric.

94. Which of the following is the most favorable curing temperature range?

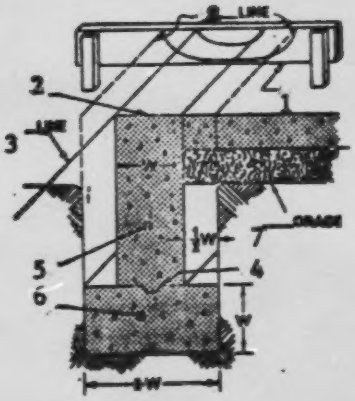
    a. 55 degrees - 90 degrees.
    b. 40 degrees - 70 degrees.
    c. 50 degrees - 80 degrees.
    d. 55 degrees - 73 degrees.

70.01.01.19. continued:

95. What is the minimum number of days needed for curing before the strength of concrete will double ?

a. 14 days.
b. 3 days.
c. 28 days.
d. 21 days.

70.01.01.21.



Foundation & Slab

96. In the illustration of the foundation and slab, **which number would** correspond to the batter board?

a. 3
b. 2
c. 1
d. 4

97. In the illustration of the foundation and slab, **which number would** correspond to or identify the footing reinforcing rod?

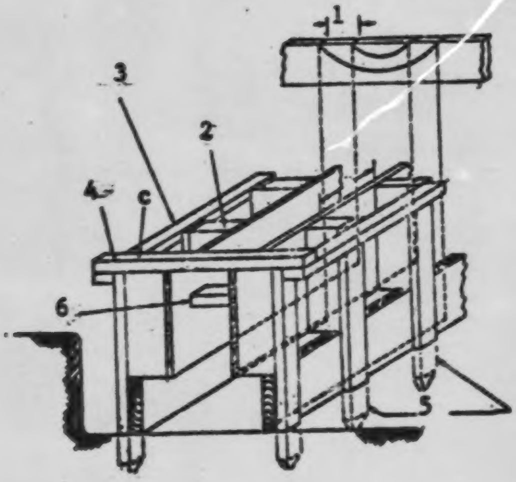
a. 8
b. 7
c. 8
d. 6

70.01.01.21. continued:

98. In the illustration of the foundation and slab, **which number would** correspond to or identify the keyway?

    a. 2
    b. 1
    c. 4
    d. 3

Square Footing Wall Assembly



99. In the illustration of the square footing wall assembly, **which number would correspond to the waler?**

    a. 3
    b. 4
    c. 5
    d. 1

100. When a water tight joint is needed at the footing wall joint, the easiest and most common way of doing this is with:

    a. rubber gaskets.
    b. galvanized corregated metal.
    c. epoxy paint.
    d. **latax paint.**

70.01.01.22.

101. Using the illustration (slab-on-ground wood frame), **which number** corresponds to the rigid insulation?

a. 4
b. 3
c. 2
d. 5

102. Using the illustration (slab-on-ground wood frame), **which number** corresponds to the membrane dampproofing?

a. 5
b. 4
c. 3
d. 6

70.01.01.22. continued:

103. In the illustration (details for slab-on-ground construction), which number corresponds to the bearing partition footing?

a. 10
b. 9
c. 8
d. 11

104. In the illsutration (details for slab-on-ground construction), which number corresponds to the continuous water proofed rigid insulation?

a. 7
b. 6
c. 5
d. 8

105. In the illustration (details for slab-on-ground construction), which number corresponds to the dampproofing membrane?

a. 6
b. 5
c. 4
d. 7

70.01.01.23.

106. Steps are more than 3' wide when constructing concrete steps, what is the minimum thickness of the risers?

a. 3/4"
b. 1'
c. 2"
d. 3"

107. Measuring in from the perpendicular, what is the approximate angle that step risers are usually tipped in at the bottom?

a. 7.5 degrees.
b. 5 degrees.
c. 15 degrees.
d. 10 degrees.

**Steps Between
Existing Walls**

108. In the illustration (steps between existing walls), **which number corresponds** to the drain?

a. 4
b. 3
c. 2
d. 5

70.01.01.23. continued:

109. In the illustration (steps between existing walls), **which number corresponds** to the riser brace?

a. 5
b. 6
c. 7
d. 8

110. In the illustration (steps between existing walls), **which number corresponds** to the concrete side wall?

a. 8
b. 1
c. 2
d. 3

70.01.01.24.

111. Concrete screeds are usually used on:

a. footings.
b. walls.
c. slabs.
d. pilasters.

112. Concrete screeds are used to perform which of the following functions?

a. level concrete.
b. plumb.
c. place concrete vertically.
d. place concrete perpendicular to a level plane.

70.01.01.24. continued:

COMMON TYPES OF FOUNDATIONS

113. In the illustration types of foundations, **which number corresponds** to a battered foundation, which does not require the use of concrete screeds?

a. 5
b. 3
c. 4
d. 2

114. In the illustration types of foundations, **which number corresponds** to a bearing wall foundation which requires the use of concrete screeds?

a. 5
b. 4
c. 3
d. 6

115. In the illustration types of foundations, **which number corresponds** to a pile cap foundation which requires the use of concrete screeds?

a. 2
b. 1
c. 6
d. 3

70.01.01.25.
70.01.01.26.

116. In the illustrations of concrete tools, which figure corresponds to a tool that is used for power finishing?

a. Fig 45
b. Fig 46
c. Fig 43
d. Fig 48

117. In the illustrations of concrete tools, which figure corresponds to a tool that is used for tamping plastic concrete?

a. Fig 46
b. Fig 36
c. Fig 37
d. Fig 38

118. A tool used to produce radii at the corners of slabs is called a(n):

a. groover.
b. trowel.
c. float.
d. edger.

119. What is the minimum depth a slab must be cut in order for a groove to act as a control joint?

a. 1/2 of the thickness.
b. 1/4 of the thickness.
c. 1/5 of the thickness.
d. 3/4 of the thickness.

120. Control joints are sometimes referred to as:

a. expansive joints.
b. construction joints.
c. expansion joints.
d. cold joints.

70.01.01.27.

121. What is the minimum thickness that expansion materials must be when used in concrete joints?

a. 1/4"
b. 1/2"
c. 3/4"
d. 1"

122. Construction joints should be laid out in what type of pattern if possible?

a. square.
b. round.
c. rectangular
d. triangular.

123. In sidewalks concrete joints are placed how often?

a. 8"
b. 7'
c. 5'
d. 15"

124. A joint that is neither a place of weakness not an interruption in concrete mass is a:

a. variance joint.
b. construction joint.
c. keyed joint.
d. beveled joint.

125. The combination construction control joints uses:

a. expansion materials.
b. keyway.
c. variance principle.
d. direct contact principle.

70.01.01.28.
70.01.01.29.

126. Which type of concrete strength is 10 times as strong as any other strength?

- a. variance strength.
- b. tensile strength.
- c. load strength.
- d. compressive strength.

127. Reinforcement steel increases concrete:

- a. load strength
- b. compressive strength
- c. tensile strength
- d. variance strength

128. What is the minimum recommended amount of concrete coverage of steel in footing?

- a. 3"
- b. 2"
- c. 1"
- d. 4"

129. When reinforcement bars are spliced what is the minimum recommended lap?

- a. 2'
- b. 1'
- c. 1 1/2'
- d. 19"

130. A good rule of thumb to keep in mind when determining bar lap is to multiply bar diameter by what?

- a. 12
- b. 10
- c. 24
- d. 16

File Code: 70.01.01.00.A2-1

Date Published: 8/15/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Experience Guide

UNIT: EXCAVATION LAYOUT - CONCRETE AND FORMS

RATIONALE:

Constructing and assembling of forms for concrete is a task assigned to carpenters. With knowledge about concrete a carpenter can better understand why forms are constructed the way they are and how to properly support and assemble them. Structures may have concrete columns, walls or other parts that requires attachment of wood or other building materials to complete the job as planned. The skills for anchoring and attaching to concrete is one of the achievements for this unit.

PREREQUISITES:

The prerequisites for this unit are those given in the course guide.

OBJECTIVES:

Provided with resources giving the methods, the tools, the materials and the equipment for construction, you will:

1. Relate information about concrete use and handling to concrete forming.
2. Construct and assemble various types of forms like footings, foundations, columns, walk, slabs and steps. The direction for construction is provided by sketches, prints and specifications.
3. Demonstrate acceptable ways to anchor construction materials to concrete.
4. Preparing a building site for excavation and placement of concrete foundation elements.

Principal Author(s): R. Arneson

RESOURCES:

Printed Materials

Carpentry. United Brotherhood of Carpenters and Joiners of America. Carpenters Printing Plant, Washington, D.C., 1950-1970.

Concrete Technology. Student Manual, Portland Cement Association in cooperation with the National Ready Mixed Concrete Association, Delmar Publishers, 1965.

Modern Carpentry. Willis H. Wagner, Goodheart-Willcox Company, Inc., 1973.

Equipment

Edger, concrete.
Line, dry.
Liner, concrete.
Maul.
Rod, elevation.
Ruler.
Saw, power hand (6½ inch blade).
Side, cutter.
Tools, hand (kit):
  - auger bit set
  - automatic drill
  - bit brace
  - block plane
  - chalk box
  - claw hammer (13, 16 and 20 oz.)
  - combination square
  - expansive bit (7/8 to 3 inch)
  - framing square
  - hack saw
  - hand saw (8 and 10 pt.)
  - keyhole saw (with next of blades)
  - nail claw
  - nail sets (1/32, 3/32, 4/32 and 5/32 inch)
  - screwdriver, four in one
  - screwdriver, Phillips, (set)
  - screwdriver, slot (set)
  - sliding T level
  - spiral screwdriver
  - spirit level
  - tape measure (100 ft, 12 ft, and 16 ft.)
  - tool box

utility knife
wood chisel (set of 6: ¼" to 1¼" in ¼" increments)
wrench, adjustable

Transit and tripod.

GENERAL INSTRUCTIONS:

This unit consists of 28 Learning Activity Packages (LAPs). Each LAP will provide specific information for completion of a learning activity.

The general procedure for this unit is as follows:

1. Read the first assigned Learning Activity Package (LAP).
2. Begin and complete the first assigned LAP.
3. Take and score the LAP test.
4. Turn in the LAP test answer sheet.
5. Determine the reason for any missed items on the LAP test.
6. Proceed to and complete the next assigned LAP in the unit.
7. Complete all required LAPs for the unit by following Steps 3 through 6.
8. In this Unit, there are some LAPs that have tests combined with other Lap tests. These combined tests are taken after completing the last LAP covered by the test.
9. Take the unit tests as described in the Unit LEG "Evaluation Procedures."
10. Proceed to the next assigned unit.

PERFORMANCE ACTIVITIES:

.01 Corner Stake Placement
.02 Transit Set-Up
.03 Determining Elevations
.04 Batter Boards
.05 Determining and Labeling Depths
.06 Quantity of Dirt to be Removed from Site
.07 Quantity of Concrete Required
.08 Types of Concrete and Their Use
.09 Placing Concrete in a Form
.10 Use and Purpose of Additives
.11 Curing Concrete
.12 Footing Lines
.13 Anchoring to Concrete
.14 Determining Cubic Yards
.15 Foundation Forms
.16 Bulkheads
.17 Set Reinforcing Steel
.18 Determining Yards of Foundation

.19 Curing Foundations
.21 Types of Forming
.22 Forming for a Slab
.23 Forming for Steps
.24 Screeds for Flat Work
.25 Tamping Concrete
.26 Marking and Edging
.27 Expansion Materials in Concrete Work
.28 Rebar Identification
.29 Ordering Reinforcing Steel

EVALUATION PROCEDURE:

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.
3. The student then takes a unit performance test if the unit pretest was successfully completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes a multiple-choice unit post test and a unit performance test.
2. Successful unit completion is meeting the listed criteria for the performance test.

FOLLOW-THROUGH

After reading this unit guide obtain the LAP for the first assigned performance activity. Read the LAP and follow the steps in the procedure section.

Student: ______________________ File Code: 70.01.01.00. A2-2

Date: ______________________ Date Published: 6/27/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

UNIT PRETEST: EXCAVATION LAYOUT-CONCRETE AND FORMS

70.01.01.01.

1. How far is the house from the curb line on the Northwest side? (see plan)
   a. 68'.
   b. 50'.
   c. 5'.
   d. 13'.

2. When are site stakes put in position?
   a. When footing is in.
   b. when excavation is about to start.
   c. when excavation is completed.
   d. when foundation is in.

3. How far from the curb is the property line. (See Plan) ?
   a. 5'.
   b. 13'.
   c. 18'.
   d. 50'.

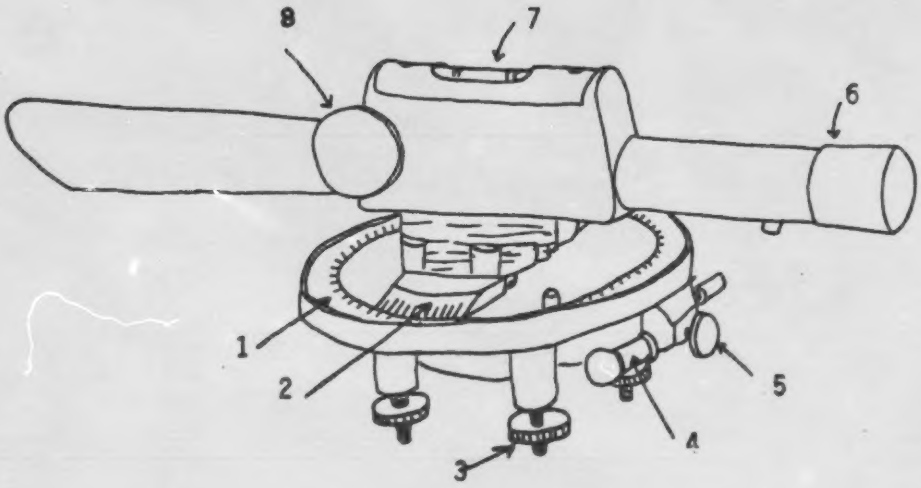
4. How wide is the concrete sidewalk? (See Plan)
   a. 13'.
   b. 5'.
   c. 18'.
   d. 50'.

5. What size is the lot? (See Plan)
   a. 100' x 200'.
   b. 150' x 200'.
   c. 200' x 200'.
   d. 90' x 250'.

70.01.01.02.

6. When using a transit and rod, the rod must be held:

   a. horizontally.
   b. level.
   c. vertically.
   d. plumb.

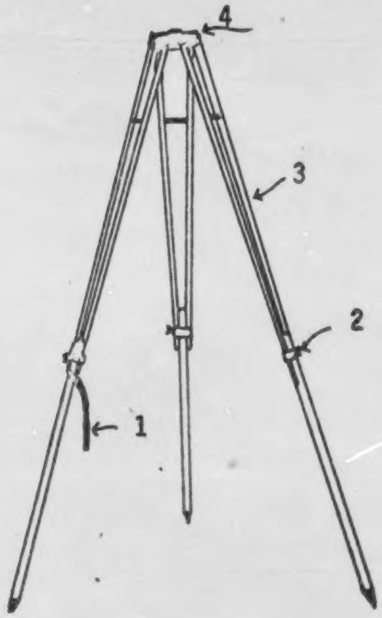


Leveling Instrument

7. In the illustration above which number on the leveling instrument would correspond to the eyepiece ?

   a. 8
   b. 6
   c. 7
   d. 5

70.01.01.02. continued:



Tripod

8. In the tripod illustration which number would correspond to the head?

a. 1
b. 3
c. 2
d. 4

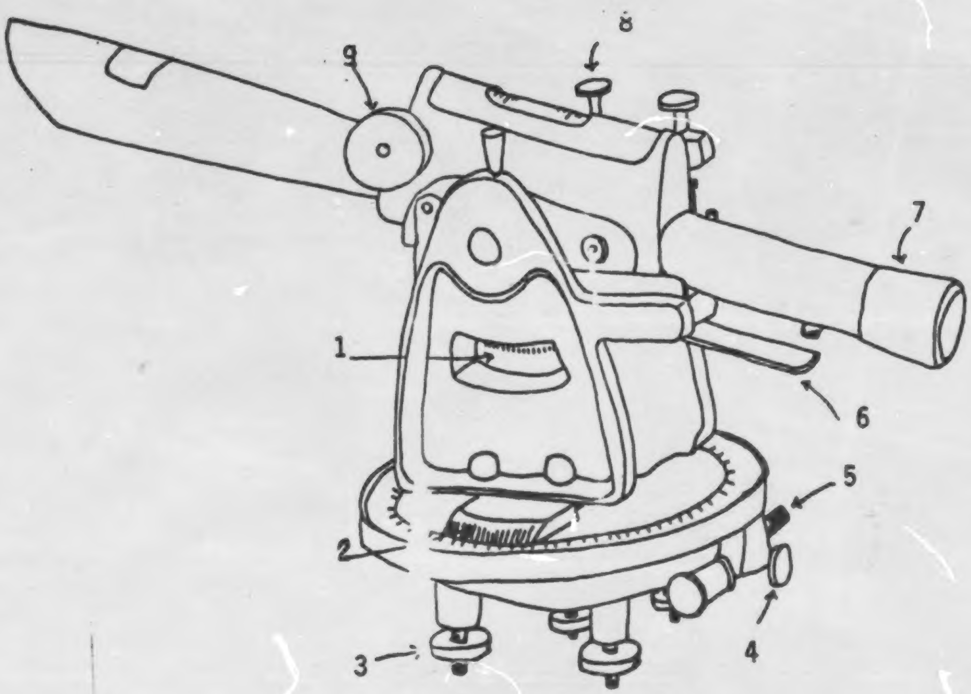
9. In the tripod illustration which number would correspond to the leg clamp?

a. 1
b. 3
c. 2
d. 4

10. In the tripod illustration which number would correspond to the leg?

a. 1
b. 4
c. 3
d. 2

70.01.01.03.



Level-Transit Illustration

11. Using the level-transit illustration, which number would identify the focasing knob?

a. 6
b. 7
c. 8
d. 9

12. Using the level-transit illustration, which number would identify the horizontal tangent screw?

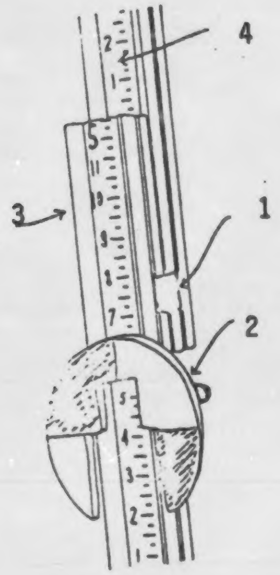
a. 2
b. 5
c. 4
d. 3

70.01.01.03. continued:

13. Using the level-transit illustration, which numbers would identify the eyepiece?

    a. 5
    b. 6
    c. 8
    d. 7

Rod Illustration



14. Using the rod illustration, which number would correspond to the rod clamp?

    a. 2
    b. 1
    c. 3
    d. 4

15. Using the rod illustration, which number would identify or correspond to the target?

    a. 1
    b. 3
    c. 2
    d. 4

70.01.01.04.

16 Batter boards should be a minimum size of:

- a. 1 x 2.
- b. 1 x 6.
- c. 1 x 4.
- d. 1 x 8.

17. When laying out excavation lines using batter boards, the lines should pass directly over:

- a. survey habs.
- b. layout stakes.
- c. finish grade.
- d. snap ties.

18. The cut made in a batter board, that is used to place building lines, is called:

- a. notch.
- b. building notch.
- c. saw cut.
- d. kerf.

19. What size material is usually used for making the ledgers for batter boards?

- a. 1 x 6 or larger.
- b. 1 x 2 or larger.
- c. 2 x 2 or larger.
- d. 1 x 4 or larger.

20. When laying out building lines, they should pass directly over the:

- a. building center.
- b. batter board stakes.
- c. layout stakes.
- d. ledger cornice.

70.01.01.05.

21. Which of the following area is unexcavated ? (See Plan)

    a. workshop.
    b. back porch.
    c. rec room.
    d. lav.

22. What is the relationship between the garage foundation and the house foundation ? (See Plan)

    a. garage is higher.
    b. garage is lower.
    c. both are level.
    d. house is higher.

23. Residential house plans are usually drawn in a scale of which of the following?

    a. 1/4" = 1'
    b. 1/8" = 1'
    c. 3/16" = 1'
    d. 3/8" = 1'

24. Which of the following plans shows location of a building?

    a. north elevation.
    b. south elevation.
    c. basement plan.
    d. plot plan.

25. To obtain a measurement not shown on a plan, which of the following would be the easiest scale to use?

    a. machinists.
    b. engineers.
    c. carpenters.
    d. architects.

70.01.01.06.

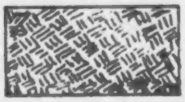
26. What is the height of the garage foundation wall? (See Plan Section C-C)

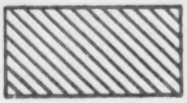
   a. 6'0"
   b. 8"
   c. 5'4"
   d. 54"

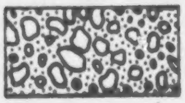
27. How wide would the trench have to be dug for installing the garage foundation? (See plan section C-C)

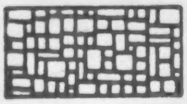
   a. 1'
   b. 2'
   c. 4'
   d. 3'

28. Which of the following is a symbol for concrete?









29. Given a plan that indicates the size of a house to be 24' x 28' and the bottom of the footing to be 6', how much earth will have to be removed in order to put in the basement or foundation?

   a. 149.3 yds.
   b. 122.3 yds.
   c. 175.4 yds.
   d. 107.7 yds.

30. Given a plan that indicates the size of a house to be 22'6" x 30' and the bottom of the footing to be 3', how much earth will have to be removed in order to put in the basement or foundation?

   a. 69.2 yds.
   b. 75 yds.
   c. 80.6 yds.
   d. 27.5 yds.

70.01.01.07.

31. Given a blueprint that states a wall 100' x 4' x 6" and footing 100' x 16" x 10", how many yards of concrete will be necessary for the job?

a. 9.5 yds.
b. 10.6 yds.
c. 15.0 yds.
d. 11.4 yds.

32. To construct a wall 150' x 8' x 1' and footing 150' x 16" x 1", how many yards of concrete are needed?

a. 60.4 yds.
b. 51.1 yds.
c. 48.2 yds.
d. 39.6 yds.

33. What is the thickness of the house footing? (See plan section A-A)

a. 6"
b. 10"
c. 2'
d. 1'

34. What is the width of the house footing? (See plan section A-A)

a. 16"
b. 1'
c. 2'
d. 1'6"

35. What is the thickness of the house foundation wall? (See plan section A-A)

a. 12"
b. 10"
c. 8"
d. 14"

70.01.01.08.

36. Portland cement is which of the following?

    a. company name.
    b. brand name.
    c. type.
    d. patent name.

37. The type of cement which has the characteristics suitable for normal use is:

    a. type I.
    b. type II.
    c. type III.
    d. type IV.

38. Of the following types of cement, which has the characteristic of minimal low heat hydration?

    a. type II.
    b. type V .
    c. type III.
    d. type IV.

39. The type of cement which would be used in a high alkalied earth is:

    a. type IV.
    b. type II.
    c. type III.
    d. type V.

40. A type of cement that has the characteristic of resistance to chemical de-icers would be identified by the letter(s):

    a. II A/E
    b. I A
    c. I A/E
    d. II A/S

70.01.01.09.

41. One thing that should not be done to cement is:

    a. to place it.
    b. to drag it.
    c. to finish it.
    d. to trowel it.

42. The term referring to the vibration of concrete is:

    a. placing.
    b. finishing.
    c. consolidating.
    d. pouring.

43. When rocks are exposed in a form after the concrete has hardened it is referred to as:

    a. latis.
    b. honeycomb.
    c. entrainment.
    d. chloride.

44. The process or chemical action of the hardening of concrete is called:

    a. hardening.
    b. setting.
    c. hydration.
    d. entrainment.

45. How is concrete strength affected when it drops too far?

    a. it separates.
    b. gains strength.
    c. hardens slowly.
    d. it hardens rapidly.

70.01.01.10.

46. One of the advantages of type III cement provides is:

    a. more tensile strength.
    b. long setting time.
    c. more compressive strength.
    d. short setting time.

47. The most commonly used adimixture is:

    a. calcium chloride.
    b. hydration.
    c. hydroxide.
    d. uretheae.

48. Calcium chloride should be added to concrete only as a part of:

    a. aggregate.
    b. cement.
    c. water.
    d. sand.

49. Calcium chloride should be added to concrete in:

    a. liquid form.
    b. powder form.
    c. liquid form with coloring.
    d. powder for with air entrainment.

50. What is the maximum per cent of calcium chloride that should be added to cement?

    a. 1%
    b. 3%
    c. 2%
    d. 4%

70.01.01.11.

51. Curing concrete with a chemical membrane uses which curing principle?

    a. water/atrospheric.
    b. water evaperation.
    c. water resistant.
    d. water retaining.

52. For the first three days the temperature of curing should be approximately:

    a. 35%
    b. 50%
    c. 40%
    d. 70%

53. From 3 to 7 days, what is the minimum temperature for curing?

    a. 40 degrees.
    b. 60 degrees.
    c. 50 degrees.
    d. 35 degrees.

54. What is the minimum number of days needed for curing before the strength of concrete will double?

    a. 28 days.
    b. 3 days.
    c. 14 days.
    d. 21 days.

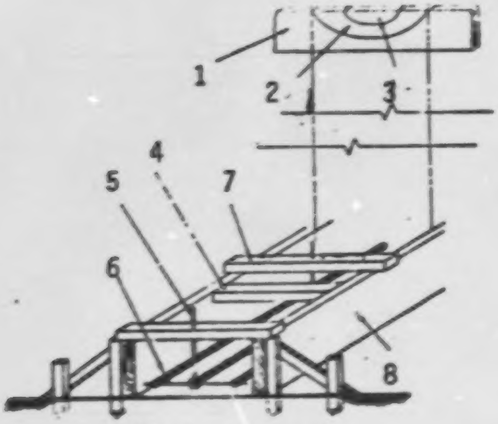
55. What is the minimum number of days recommended for curing conrete?

    a. 1 day.
    b. 7 days.
    c. 2 days.
    d. 3 days.

70.01.01.12.

56. The ability of concrete to resist crushing is referred to as:

    a. tensible strength.
    b. compressive strength.
    c. density strength.
    d. massive strength.



Typical Footing

57. In the typical footing illustration, which number would correspond to the spreader?

    a. 1
    b. 2
    c. 3
    d. 4

58. In the typical footing illustration, which number would correspond to the wall thickness?

    a. 1
    b. 2
    c. 4
    d. 3

70.01.01.12. continued:

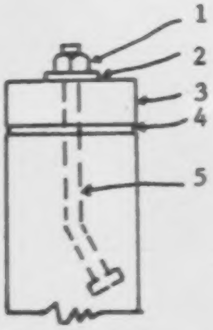
59. In the typical footing illustration, which number would correspond to the form tie?

a. 7
b. 5
c. 6
d. 8

60. In the typical footing illustration , which number would correspond to the footing form?

a. 8
b. 5
c. 6
d. 7

70.01.01.13.



Typical Anchor Bolt

61. On the typical anchor bolt illustration, which number would correspond to the bolt?

a. 5
b. 1
c. 2
d. 3

62. In the typical anchor bolt illustration, which number would correspond to the nut? .

a. 3
b. 2
c. 1
d. 4

70.01.01.13. continued:

63. In the typical anchor bolt illustration, which number would correspond to the grout?

a. 4
b. 5
c. 6
d. 1

64. In the typical anchor bolt illustration, which number would correspond to the washer?

a. 3
b. 2
c. 4
d. 5

65. A device used to fasten intersecting wall in place is called?

a. fastener.
b. bolt.
c. rod.
d. anchor.

70.01.01.14.

66. How much concrete will it take to pour a wall 8" thick, 10' long and 2' high?

a. 50 cubic yds.
b. 5 cubic yds.
c. .5 cubic yds.
d. 2.5 cubic yds.

67. How much concrete will it take to pour the footing on the NW side of the garage? (See Plan)

a. 1 cubic yd.
b. 1.5 cubic yds.
c. .5 cubic yds.
d. 2.2 cubic yds.

70.01.01.14. continued:

68. How much concrete will it take to pour the wall on the NW side of the garage?

    a. 27.2 cubic yds.
    b. 272 cubic yds.
    c. 2.72 cubic yds.
    d. .272 cubic yds.

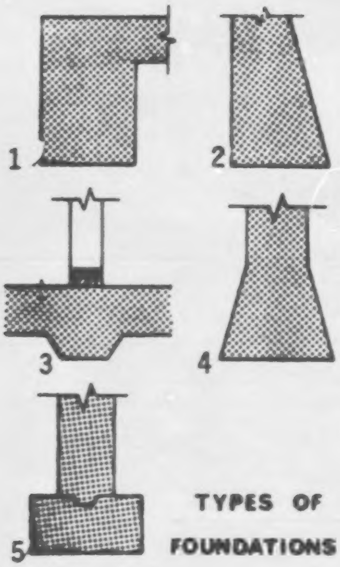
69. What is the width of the house footing? (See plan section A-A)

    a. 2'
    b. 1'
    c. 16"
    d. 1'6"

70. What is the thickness of the house foundation wall? (See plan section A-A)

    a. 8"
    b. 10"
    c. 14"
    d. 12"

70.01.01.15.

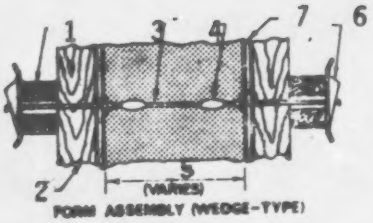


TYPES OF FOUNDATIONS

71. Which one of the following numbers would correspond to a bearing wall foundation? Use the illustration of types of foundations.

a. 4
b. 3
c. 5
d. 1

70.01.01.15. continued:



FORM ASSEMBLY (WEDGE-TYPE)

72. Using the form assembly (wedge type) illustration, which number corresponds to the bread back of the form assembly?

   a. 6
   b. 5
   c. 4
   d. 7

73. Walers can be secured at corners by:

   a. lapping walers and/or using backing boards.
   b. nailing to plyform.
   c. tying units to batterboards.
   d. wiring walers to studs.

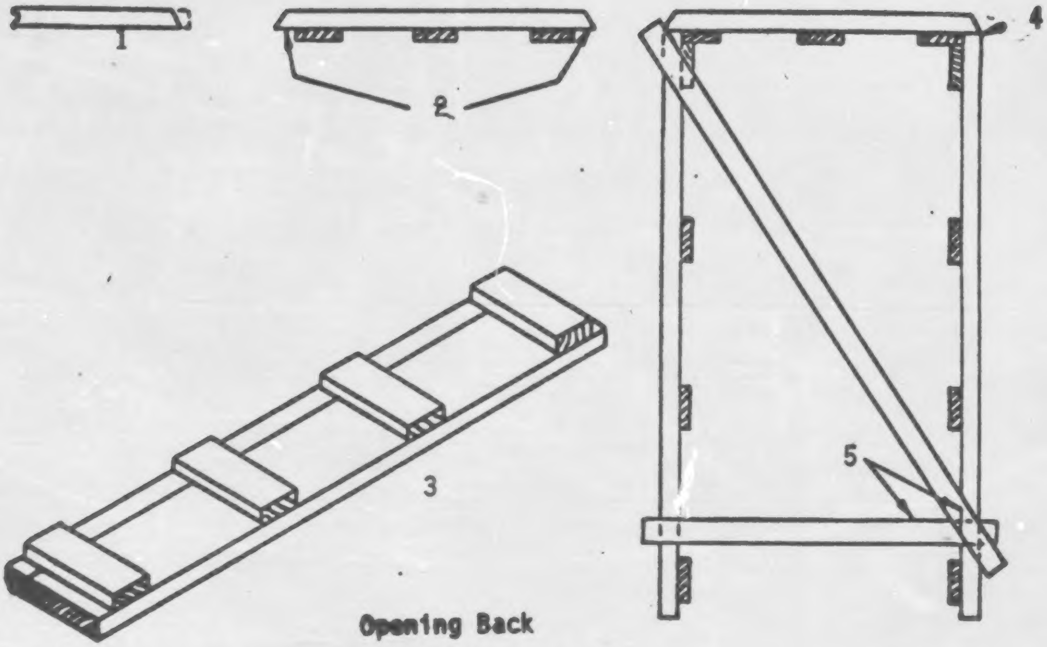
74. After all the foundation panels are in place, the line and block method can be used for:

   a. measuring form depth.
   b. obtaining overall form length.
   c. establishing F.F. grade.
   d. setting the form to the exact building line.

75. There are several methods used to locate corners with the most acceptable way being:

   a. measure and compare the diagonals of opposite corners.
   b. measure from corner to corner.
   c. restake at lower level of wall.
   d. plumb down from building lines off batterboards.

70.01.01.16.



Opening Back

76. On an opening back the header ends should be:

    a. rabbeted.
    b. square.
    c. leveled.
    d. dadoed.

77. In the illustration the number that indicates how the header of an opening back should look is which of the following?

    a. 2
    b. 1
    c. 3
    d. 4

70.01.01.16. continued:

78. On the opening back illustration the number that shows position of nail cleets is which of the following.

    a. 1
    b. 4
    c. 5
    d. 3

79. On the opening back illustration, the member that holds squareness is identified by which number?

    a. 5
    b. 1
    c. 2
    d. 3

80. Which tool is used to install opening backs?

    a. level transit.
    b. transit.
    c. level (head)
    d. rod.

70.01.01.17.

81. Which type of concrete strength is 10 times as strong as any other strength?

    a. load.
    b. tensile.
    c. compressive.
    d. variance.

82. Tensile strength refers to:

    a. load.
    b. crushing.
    c. bending.
    d. variance.

70.01.01.17. continued:

83. Most reinforcment bars come in what lengths?

    a. 16'
    b. 20'
    c. 10'
    d. 15'

84. Where is the reinforcement steel placed in a beam?

    a. on the upper portion just past the middle.
    b. near the upper side.
    c. near the middle.
    d. near the lower side.

85. A good rule of thumb to keep in mind when determining bar lap is to multiply bar diameter by:

    a. 24.
    b. 10.
    c. 12.
    d. 16.

70.01.01.18.

86. Aggregate size in concrete should not exceed what fraction of the distance. between steel and forms.

    a. 1/2
    b. 3/4
    c. 1/4
    d. 5/8

87. For reinforced slabs on the ground the aggregate size should not exceed what fraction of the thickness of the slab.

    a. 3/4
    b. 1/2
    c. 1/3
    d. 1/4

70.01.01.18. continued:

88. A batch of concrete that has a coarse, unworkable characteristic has which of the following?

    a. too much coarse aggregate.
    b. too much fine aggregate.
    c. too little coarse aggregate.
    d. too little fine aggregate.

89. A batch that is uneconomical to mix since its strength factors require high water and high cement requirements has which of the following?

    a. too little coarse aggregate.
    b. too much coarse aggregate.
    c. too much fine aggregate.
    d. fine and coarse aggregate are equal.

90. The maximum slump allowable for reinforced foundation walls is:

    a. 4"
    b. 1"
    c. 3"
    d. 2"

70.01.01.19.

91. A chemical action that occurs between water and portland cement is called:

    a. calcium chloride.
    b. hydration.
    c. sulfation.
    d. air entrainment.

92. In order for hydration to occur, it is necessary to prevent which of the following?

    a. sulfation.
    b. high early setting.
    c. evaporation.
    d. air entrainment.

70.01.01.19. continued:

93. Proper curing of concrete for 7 days will increase concrete strength by approximately what percentage?

    a. 20%
    b. 10%
    c. 50%
    d. 30%

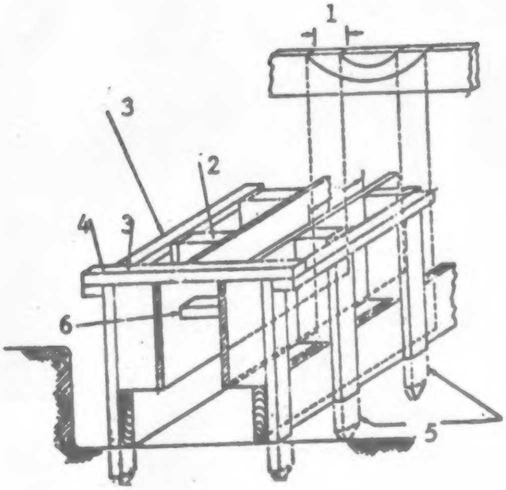
94. Curing conceete with a chemical membrane uses which curing principle?

    a. water evaporation.
    b. water retaining.
    c. water resistance.
    d. water atmospheric.

95. For the first three days the temperature of curing should be approximately:

    a. 50 degrees.
    b. 70 degrees.
    c. 40 degrees.
    d. 40 degrees.

70.01.01.21. continued:



Square Footing Wall Assembly

96. In the illustration of the square footing wall assembly , which number would correspond to the width of the footing outside the wall?

a. 2
b. 1
c. 3
d. 4

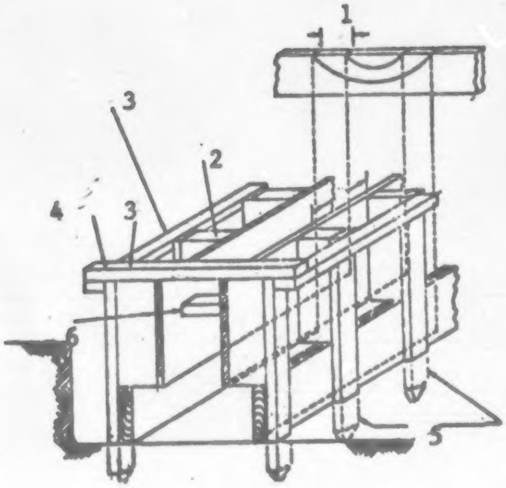
97. In the illustration of the square footing wall assembly, which number would correspond to spacer block?

a. 4
b. 3
c. 2
d. 5

98. In the illustration of the square footing wall assembly, which number would correspond to form stake?

a. 5
b. 6
c. 1
d. 2

70.01.01.21. continued:



Square Footing Wall Assembly

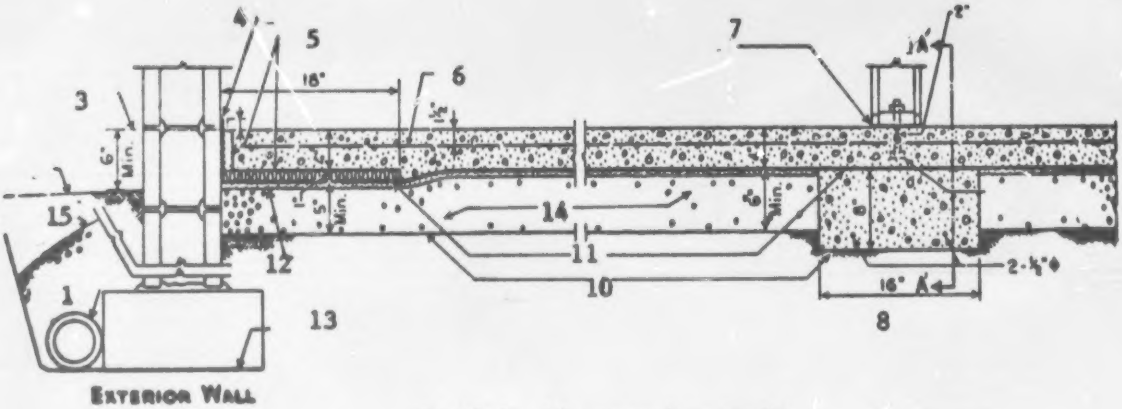
99. In the illustration of the square footing wall assembly, which number would correspond to spreader (wall) ?

    a. 3
    b. 1
    c. 2
    d. 6

100. The tie that is usually used in pilasters or columns because it can be removed is the:

    a. wire/spreader tie.
    b. snap tie.
    c. taper tie.
    d. spacer/screw tie.

70.01.01.22.


4
5
18"
6
3
6" Min.
1½"
7
1A
2"
15
14
12
1"
5" Min.
6" Min.
11
10
2-½"Φ
16"
A
1
13
8
EXTERIOR WALL

Details for slab-on-ground construction.

101. In the illustration (details for slab-on-ground construction), which number corresponds to the outside wall footing below frost line?

a. 13
b. 1
c. 2
d. 3

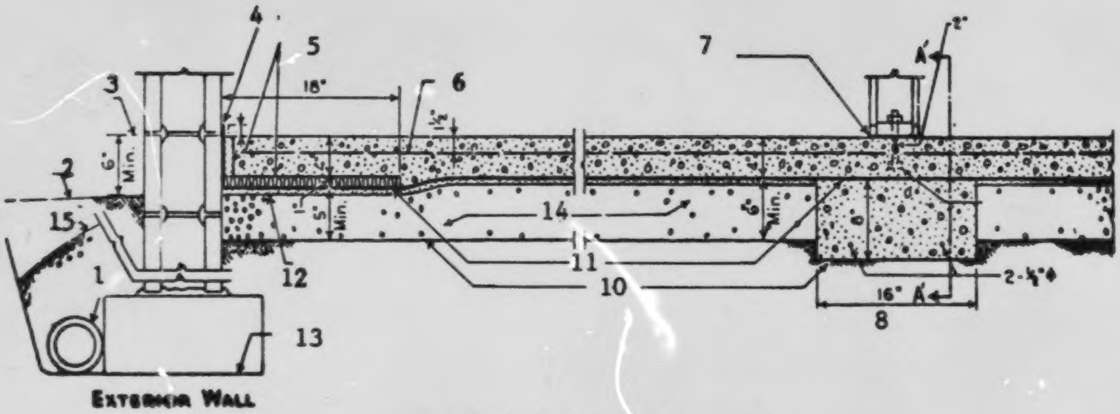
102. In the illustration (details for slab-on-ground construction), which number corresponds to the bearing partition footing?

a. 10
b. 9
c. 8
d. 11

103. In the illustration (details for slab-on-ground construction), which number corresponds to the continuous water proofed rigid insulation?

a. 7
b. 6
c. 5
d. 8

70.01.01.22.


4
5
3
18"
6
1/2"
7
2"
A'
6" Min.
2
15
1
12
14
5" Min.
6" Min.
11
10
16"
A'
2-1/2"φ
8
13
EXTERIOR WALL

Details for slab-on-ground construction.

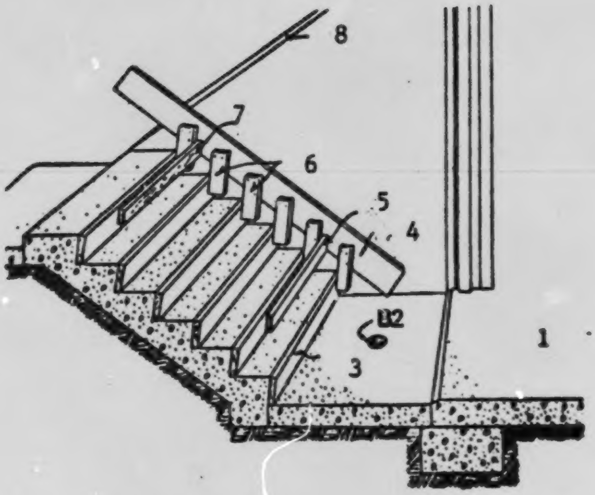
104. In the illustration (details for slab-on-ground construction), which number corresponds to the damp rooting membrane?

a. 6
b. 5
c. 4
d. 7

105. In the illustration (details for slab-on-ground construction), which number corresponds to the gravel or stone fill?

a. 15
b. 1
c. 10
d. 8

70.01.01.23.



How forms can be constructed for steps located between existing walls.

The following 5 questions refer to the illustration above.

106. In the illustration (steps between existing walls), which number corresponds to the basement floor?

a. 1
b. 2
c. 3
d. 4

107. In the illustration (steps between existing walls), which number corresponds to the drain?

a. 4
b. 3
c. 2
d. 5

70.01.01.23. continued:

108. In the illustration (steps beween existing walls), **which number would** correspond to the riser form?

a. 3
b. 4
c. 5
d. 6

109. In the illustration (steps beteen existing walls), **which number corresponds** to the riser brace ?

a. 5
b. 6
c. 7
d. 8

110. In the illustration (steps between existing walls), **which number corresponds** to the concrete side wall ?

a. 8
b. 1
c. 2
d. 3

70.01.01.24.

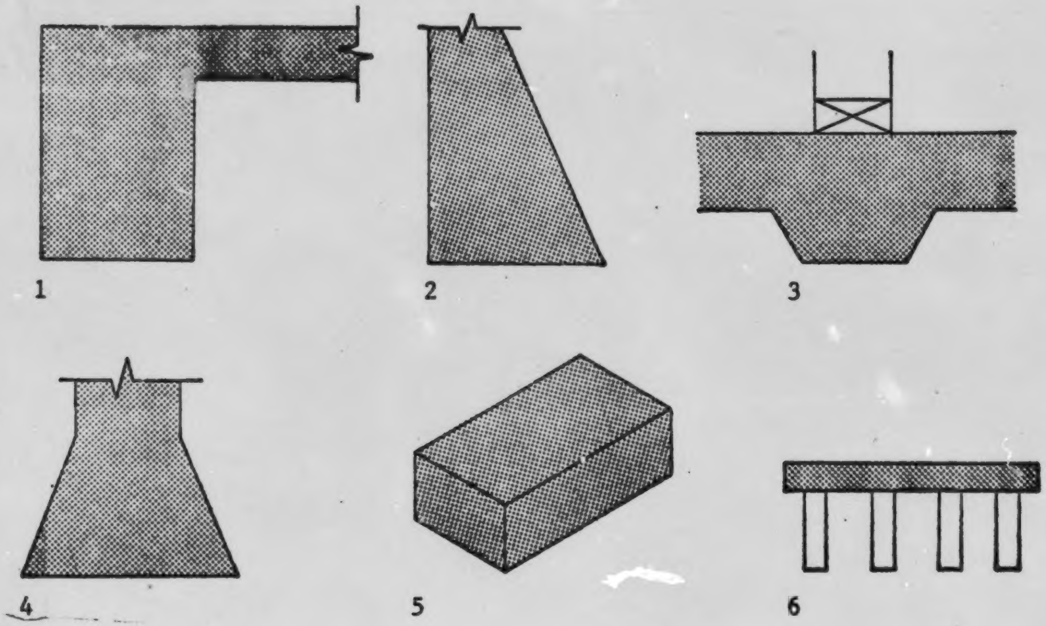
111. Concrete screeds are usually used on:

a. footings.
b. walls.
c. slabs.
d. pilasters.

112. If reinforcement bars are used to join slabs, they must:

a. protrude through the slab forms.
b. be installed after concrete takes its set.
c. be lagged bars.
d. be smooth bars.

70.01.01.24. continued:



COMMON TYPES OF FOUNDATIONS

The following 3 questions refer to the illustration

113. In the illustration types of foundations, **which number corresponds to** a flared foundation which does not require the use of concrete screeds?

a. 1
b. 5
c. 6
d. 4

114. In the illustration types of foundations, **which number corresponds to** a pier foundation which does not require the use of concrete screeds?

a. 1
b. 6
c. 5
d. 2

70.01.01.24. continued:

115. In the illustration types of foundations, **which number would correspond** to a pile cap foundation which requires the use of concrete screeds?

a. 2
b. 1
c. 6
d. 3

70.01.01.25.
70.01.01.26.

116. A tamper is commonly called a:

a. trowel.
b. rod.
c. float.
d. jitterbug.

117. Which of the following is the recommended **maximum** slump for concrete when using tampers?

a. 3"
b. 1"
c. 3"
d. 4"

118. Usually, how thick are pedestrian sidewalks?

a. 6"
b. 3"
c. 5"
d. 4"

119. What is the minumum depth a slab must be cut in order for a groove to act as a control joint?

a. 1/2 of the thickness.
b. 1/4 of the thickness.
c. 1/5 of the thickness.
d. 3/4 of the thickness.

70.01.01.25.
70.01.01.26. continued:

120.Control joints are sometimes referred to as:

a. expansive joints.
b. construction joints.
c. expansion joints.
d. cold joints.

70.01.01.27.

121.In sidewalks, concrete joints are placed how often?

a. 8"
b. 7'
c. 5'
d. 15"

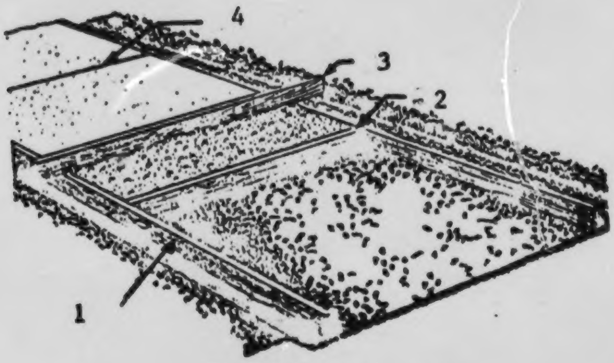
122.The combination construction control joints uses:

a. expansion materials.
b. key way.
c. variance principle.
d. direct contact principle.

123.When a saw cut is placed in a wood key way, this is properly called:

a. refering.
b. cutting.
c. notching.
d. grooving.

70.01.01.27. continued:



Typical Sidewalk

124. In the typical sidewalk illustration, **which number corresponds to the** strike board?

a. 4
b. 1
c. 2
d. 3

125. In the typical sidewalk illustration, **which number corresponds to the** expansion joint?

a. 1
b. 3
c. 2
d. 4

70.01.01.28.
70.01.01.29.

126. Tensile strength refers to:

a. crushing.
b. bending.
c. load.
d. variance.

70.01.01.28.
70.01.01.29.

127. The most common reinforcement material used in concrete is made of:

a. steel.
b. copper.
c. aluminum.
d. brass.

128. Most reinforcement bars come in what lengths?

a. 20'
b. 18'
c. 10'
d. 15'

129. What is the minimum recommended amount of concrete coverage of steel in slabs ?

a. 1"
b. 3/4"
c. 1 1/2"
d. 2"

130. When reinforcement bars are spliced what is the minumum recommended lap?

a. 2'
b. 1'
c. 1 1/2'
d. 19"

UNIT PRETEST ANSWER KEY: EXCAVATION LAYOUT-CONCRETE AND FORMS

LAP		
01	1.	A
	2.	B
	3.	C
	4.	B
	5.	C
02	6.	D
	7.	B
	8.	B
	9.	C
	10.	B
03	11.	D
	12.	B
	13.	D
	14.	B
	15.	C
04	16.	B
	17.	B
	18.	D
	19.	A
	20.	C
05	21.	B
	22.	C
	23.	A
	24.	D
	25.	D
06	26.	C
	27.	C
	28.	D
	29.	A
	30.	B
07	31.	D
	32.	B
	33.	D
	34.	C
	35.	A
08	36.	C
	37.	A
	38.	D
	39.	D
	40.	B
09	41.	B
	42.	C
	43.	B
	44.	C
	45.	D
10	46.	D
	47.	A
	48.	C
	49.	A
	50.	C
11	51.	D
	52.	D
	53.	C
	54.	A
	55.	B
12	56.	B
	57.	D
	58.	D
	59.	A
	60.	A
13	61.	A
	62.	C
	63.	A
	64.	B
	65.	D
14	66.	C
	67.	D
	68.	C
	69.	A
	70.	D
15	71.	B
	72.	C
	73.	A
	74.	D
	75.	D
16	76.	C
	77.	B
	78.	D
	79.	A
	80.	C
17	81.	C
	82.	C
	83.	B
	84.	D
	85.	A
18	86.	B
	87.	C
	88.	A
	89.	C
	90.	A

UNIT PRETEST ANSWER KEY: EXCAVATION LAYOUT-CONCRETE FORMS

LAP		
19	91.	B
	92.	C
	93.	C
	94.	B
	95.	B
21	96.	B
	97.	C
	98.	A
	99.	D
	100.	C
22	101.	A
	102.	C
	103.	C
	104.	C
	105.	A
23	106.	A
	107.	C
	108.	A
	109.	A
	110.	A
24	111.	C
	112.	A
	113.	D
	114.	C
	115.	C
25-26	116.	D
	117.	C
	118.	D
	119.	C
	120.	B
27	121.	C
	122.	B
	123.	A
	124.	D
	125.	D
28-29	126.	B
	127.	A
	128.	A
	129.	B
	130.	B

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.01.01.A2-0

Date Published: 8/15/75

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Corner Stake Placement

OBJECTIVES:

Given a sketch and the necessary tools and equipment, set the stakes for a building site.

Interpret plot plan.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Carpentry, Carpenters Printing Plant.

Modern Carpentry, Wagner.

Claw hammer
Dry line
Post maul
Tape measure (100 ft.)

PROCEDURE:

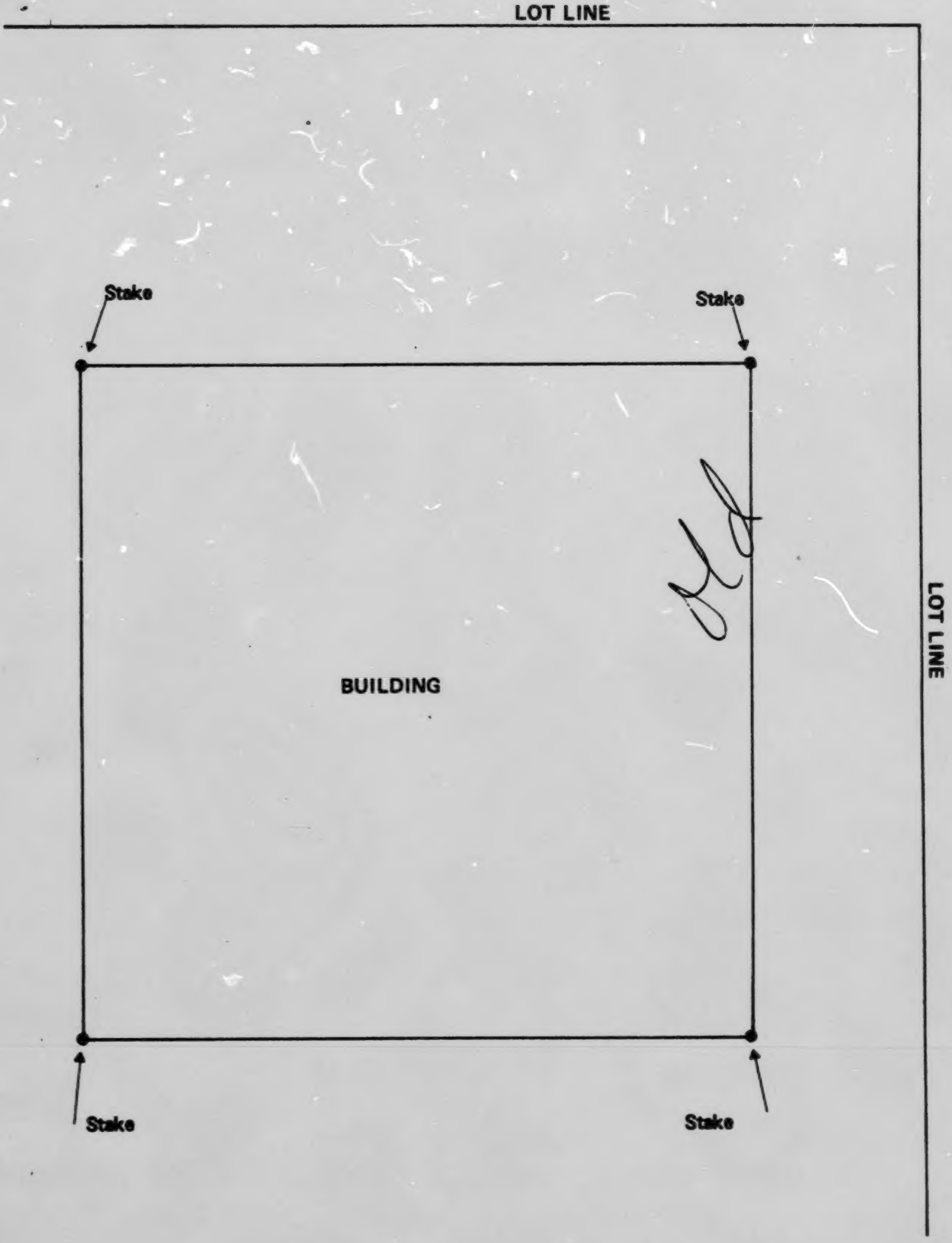
1. Read pages 43-51 and 87-90 in Modern Carpentry and pages 1-3, Unit II in Carpentry.

2. Have the instructor dimension the attached drawing.

3. Obtain 18" x 1" x 2" stakes.

Principal Author(s): R. Arneson

4. Obtain the necessary tools and equipment.
5. Set stakes in the position indicated by the sketch following the procedure given in the resource.
6. Have the stake placement evaluated.
7. Take the LAP test.


LOT LINE
Stake
Stake
BUILDING
LOT LINE
Stake
Stake

Student: ______________________ File Code: 70.01.01.01. A2-2

Date: ______________________ Date Published: 6/27/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: CORNER STAKE PLACEMENT

1. When laying out building lines, the safest person to perform the layout of building lines is:

   a. the carpenter.
   b. the owner.
   c. a surveyor.
   d. the city engineer.

2. It is essential that the carpenter be aware of:

   a. building codes - city.
   b. building codes - state.
   c. building codes - national.
   d. all of the above.

3. When staking out corner stakes for a building site, strings should be attached to the:

   a. stakes.
   b. batter post.
   c. nails on stakes.
   d. nails on batter posts.

4. To determine squareness of building lines which of the following is used?

   a. diagonals unequal.
   b. two sides equal.
   c. all sides equal.
   d. diagonals equal.

5. Before site layout, building sites on rough terrain should be:

   a. finish graded.
   b. rough graded.
   c. leveled.
   d. landscaped.

6. **In the building construction area, corner stakes are used to:**

   a. indicate building structure.
   b. indicate building type.
   c. indicate building diameter.
   d. indicate rough excavation location.

7. How far is the house from the property line on the northeast side? (See Plan)

   a. 200'
   b. 58'
   c. 68'
   d. 175'

8. How far is the house from the curb line on the northwest side?

   a. 68'
   b. 50'
   c. 5'
   d. 13'

9. How wide is the flagstone walk ? (See Plan)

   a. 5'
   b. 13'
   c. 4'
   d. 8'

10. How wide is the concrete sidewalk? (See Plan)

   a. 13'
   b. 5'
   c. 18'
   d. 50'

LAP TEST ANSWER KEY: CORNER STAKE PLACEMENT

1. D
2. D
3. C
4. D
5. B
6. D
7. B
8. A
9. C
10. B

File Code: 70.01.01.02.A2-0

Date Published: 8/15/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Transit Set-Up

OBJECTIVES:

Set up and level a builders transit following manufacturer's recommended practices and procedures.

EVALUATION PROCEDURE:

Transit set-up meets the criteria shown on the attached checklist and the manufacturer's specifications and procedures.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Carpentry, Carpenter's Printing Plant.
Modern Carpentry, Wagner.

Rod
Tripod
Transit

PROCEDURE:

1. Read pages 43-51 in Modern Carpentry and page 5, Unit II in Carpentry.
2. Obtain the transit and rod.
3. Set up and level the builders transit following the manufacturer's recommended procedures.

Principal Author(s): R. Arneson

Caution: Be sure you do not tighten leveling screws any tighter than just snug otherwise the transit will be ruined.

4. Verify the transit set-up using the attached checklist.

5. Ask your instructor to evaluate the transit set-up.

6. Take the LAP test.

CHECKLIST

______1. Instrument is solidly positioned.

______2. Leveling screws are only just snug.

______3. Instrument is level.

Student: ____________________ File Code: 70.01.01.02. A2-2

Date: ____________________ Date Published: 6/27/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: TRANSIT SET-UP

1. The builder's level is a precision instrument that:

   a. determines grades.
   b. swings in the horizontal plane.
   c. can replace the straightedge and level.
   d. all of the above.

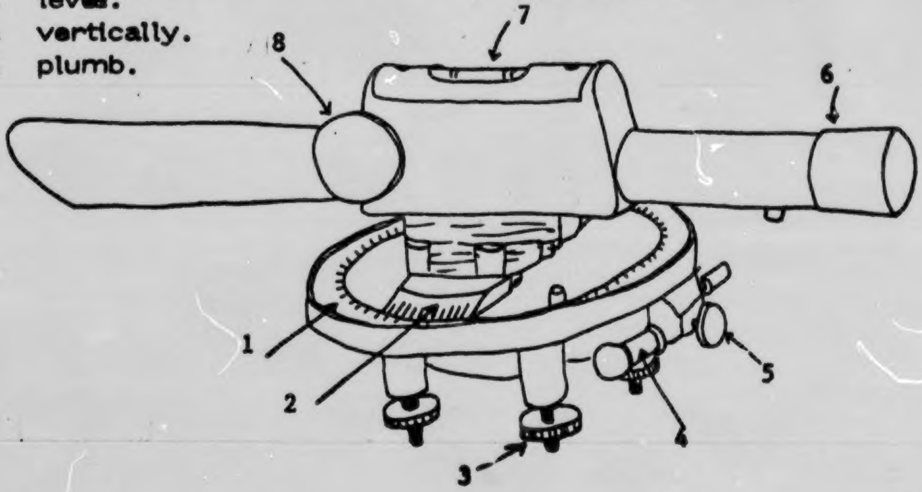
2. To position a transit leveling instrument directly over a given point, which of the following tools is used?

   a. level.
   b. straightedge.
   c. square.
   d. plumb bob.

3. When using a transit and rod, the rod must be held:

   a. horizontally.
   b. level.
   c. vertically.
   d. plumb.

Leveling Instrument



4. In the illustration which number on the leveling instrument would correspond to the eyepiece?

   a. 8
   b. 6
   c. 7
   d. 5

5. In the illustration of the leveling instrument, **which number would** correspond to the focasing knob?

   a. 8
   b. 1
   c. 6
   d. 7

6. In the illustration of the leveling instrument, **which number would** correspond to the leveling screw?

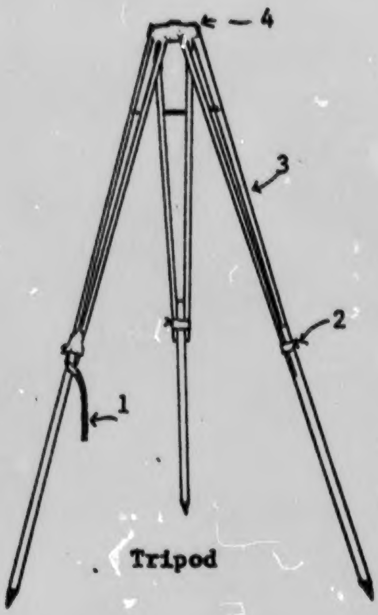
   a. 1
   b. 2
   c. 4
   d. 3

7. In the illustration of the leveling instrument, **which number would** correspond to the tangent screw?

   a. 1
   b. 4
   c. 3
   d. 2

8. In the illustration of the leveling instrument, **which number would** correspond to the spirit level?

   a. 6
   b. 8
   c. 7
   d. 1



Tripod

9. In the tripod illustration, which number would correspond to the head?

   a. 1
   b. 4
   c. 3
   d. 2

10. In the tripod illustration, which number would correspond to the leg?

   a. 1
   b. 3
   c. 2
   d. 4

LAP TEST ANSWER KEY: TRANSIT SET-UP [illegible]

1. A
2. D
3. D
4. B
5. A
6. D
7. B
8. C
9. B
10. B

File Code: 70.01.01.03.A2-0

Date Published: 8/15/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Determining Elevations

OBJECTIVE:

Given the equipment, determine the elevation of assigned points.

EVALUATION PROCEDURE:

Elevation readings are accurate to within + or - 1/4".

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Rod
Transit
Tripod

PROCEDURE:

1. Read pages 43-51 in Modern Carpentry.
2. Obtain specifications for elevations.
3. Record the readings.
4. Have readings evaluated.
5. Take the LAP test.

Principal Author(s): R. Arneson

Student: ______________________ File Code: 70.01.01.03. A2-2

Date: ______________________ Date Published: 6/27/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: DETERMINING ELEVATIONS

1. What is the fixed elevation or stationary point usually labeled?

   a. 000
   b. 200.0
   c. 100.0
   d. 99.9

2. Given that the elevation at merestone north corner is the stationary point, what is the height at the east corner of the house in relation to this stationary point? (See Plan)

   a. one foot higher.
   b. they are the same.
   c. one foot lower.
   d. one inch higher.

3. How much higher is the finish floor than the elevation on the east corner of the house? (See Plan)

   a. 1'6"
   b. 1'5"
   c. 1"
   d. 2.5"

4. How much lower is the dirt that is on the end of the planter on the south east side of the house than the stationary point labeled 100? (See Plan)

   a. 6'
   b. 6"
   c. 6'6"
   d. 94"

5. What is the height at the bottom of the service entrance in relation to the stationary point of 100 at merestone north corner? (See Plan)

   a. 10" higher.
   b. 1' higher.
   c. 1" higher.
   d. 1' lower.

Level Transit

6. Using the level transit illustration, **which number would identify the** leveling screw?

   a. 1
   b. 2
   c. 3
   d. 4

7. Using the level-transit illustration, **which number would identify the** horizontal index pointer and vernier?

   a. 2
   b. 1
   c. 3
   d. 4

8. Using the level-transit illustration, **which number would identify the** eyepiece?

   a. 5
   b. 6
   c. 8
   d. 7

Rod

9. Using the rod illustration, **which number would correspond to the** rod clamp.

   a. 2
   b. 1
   c. 3
   d. 4

10. Using the rod illustration, **which number would identify or correspond** to the target?

   a. 1
   b. 3
   c. 2
   d. 4

LAP TEST ANSWER KEY: DETERMINING ELEVATIONS

1. C
2. A
3. A
4. A
5. D
6. C
7. A
8. D
9. B
10. C

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.01.04.A2-0

Date Published: 8/19/75

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Batter Boards

OBJECTIVE:

Using a sketch and appropriate tools, set up batter boards following given procedures.

EVALUATION PROCEDURE:

Installation meets the criteria shown on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Carpentry, Carpenters Printing Plant.

Claw Hammer
Line
Maul

PROCEDURE:

1. Read paper 87-92 in Modern Carpentry and pages 9-10, Unit 2 in Carpentry.
2. Review the sketch for LAP: Corner Stake Placement.
3. Obtain the tools and set up the batter boards following the procedures outlined in the reference.
4. Have the batter board installation evaluated.
5. Take the LAP test.

Principal Author(s): R. Arneson

CHECKLIST

______1. Batter boards are solid.

______2. Batterboards are positioned correctly.

Student: ____________________

File Code: 70.01.01.04. A2-2

Date: ____________________

Date Published: 6/27/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: BATTER BOARDS

1. Batter boards are used to:

   a. construct walls.
   b. layout building lines.
   c. construct ceilings.
   d. construct roofs.

2. Batter boards should be a minimum size of:

   a. 1 x 2
   b. 1 x 6
   c. 1 x 4
   d. 1 x 8

3. Batter boards are used to layout:

   a. wall height.
   b. ceiling lines.
   c. floor height.
   d. footing lines.

4. Batter boards should be located a minimum of how many feet from the building line.

   a. 2
   b. 4
   c. 1
   d. 7

5. The cut made in a batter board, that is used to place building lines, is called:

   a. notch.
   b. building notch.
   c. saw cut.
   d. kerf.

6. What size material is usually used for making the stakes for batter boards?

   a. 2 x 4.
   b. 1 x 2.
   c. 2 x 2.
   d. 1 x 4.

7. What size material is usually used for making the ledgers for batter boards?

   a. 1 x 6 or larger.
   b. 1 x 2 or larger.
   c. 2 x 2 or larger.
   d. 1 x 4 or larger.

8. What is the minimum distance batter boards should be located from the building lines?

   a. 1'
   b. 2'
   c. 4'
   d. 3'

9. Ledgers should be located in which of the following positions?

   a. perpendicular.
   b. vertical.
   c. inclined.
   d. level.

10. When leveling out building lines, they should pass directly over the:

   a. building center.
   b. batter board stakes.
   c. lay out stakes.
   d. ledger cornice.

LAP TEST ANSWER KEY: **BATTER BOARDS**

1. B
2. B
3. D
4. B
5. D
6. A
7. A
8. C
9. D
10. C

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.01.05.A2-0

Date Published: 8/15/75

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Determining and Labeling Depths

OBJECTIVES:

Determine and label the depth at four points.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCE:

Modern Carpentry, Wagner.

Rod
Transit
Tripod

PROCEDURE:

1. Read pages 71-86 in Modern Carpentry.
2. Obtain specifications.
3. Set up the transit.
4. Determine the level of ground at the points identified on the attached plot plan.
5. Lable the stakes for the depth of earth to be cut or filled.
6. Have your labeling evaluated.
7. Take the LAP test.

Principal Author(s): R. Arneson

Student: ______________________ File Code: 70.01.01.05. A2-2

Date: ______________________ Date Published: 6/27/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: DETERMINING AND LABELING DEPTHS [illegible]

1. If the east corner of the house is assumed to be the point in section A-A of the plan, how far down in the ground will excavation of the basement have to go to the bottom of the footing? (See Plan)

   a. 8'6"
   b. 9'7"
   c. 8'1"
   d. 5'2"

2. Which of the following is true concerning the layout of the finish grade on the plot plan? (See plan provided plot)

   a. lot is level.
   b. lot slopes to the NW.
   c. lot slopes to the NE.
   d. lot slopes to the SW.

3. Which of the following areas is unexcavated? (See Plan)

   a. garage.
   b. rec room.
   c. workshop.
   d. lav.

4. Which of the following areas is not excavated? (See Plan)

   a. rec room.
   b. workshop.
   c. storage.
   d. stoop (front).

5. How much lower is the top of the stoop foundation than the basement?

   a. 25"
   b. 5"
   c. 2'4"
   d. 5'

6. Which of the following area is unexcavated ? (See Plan)

   a. workshop.
   b. back porch.
   c. rec room.
   d. lav.

7. What is the relationship between the garage foundation and the house foundation? (See Plan)

   a. garage is higher.
   b. garage is lower.
   c. both are level.
   d. house is higher.

8. Residential house plans are usually drawn in a scale of which of the following?

   a. 1/4" = 1'
   b. 1/8" = 1'
   c. 3/16" = 1'
   d. 3/8" = 1'

9. Which of the following plans shows location of a building?

   a. north elevation.
   b. south elevation.
   c. basement plan.
   d. plot plan.

10. To obtain a measurement not shown on a plan, which of the following would be the easiest scale to use?

    a. machinists.
    b. engineers.
    c. carpenters.
    d. architects.

70.01.01.05. A2-2

LAP TEST ANSWER KEY: DETERMINING AND LABELING DEPTHS

1. C
2. D
3. A
4. D
5. B
6. B
7. C
8. A
9. D
10. D

File Code: 70.01.01.06.A2-0

Date Published: 8/15/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Quantity of Dirt to Be Removed from Site

OBJECTIVE:

Determine the cubic yards of dirt to be removed from a given site.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP

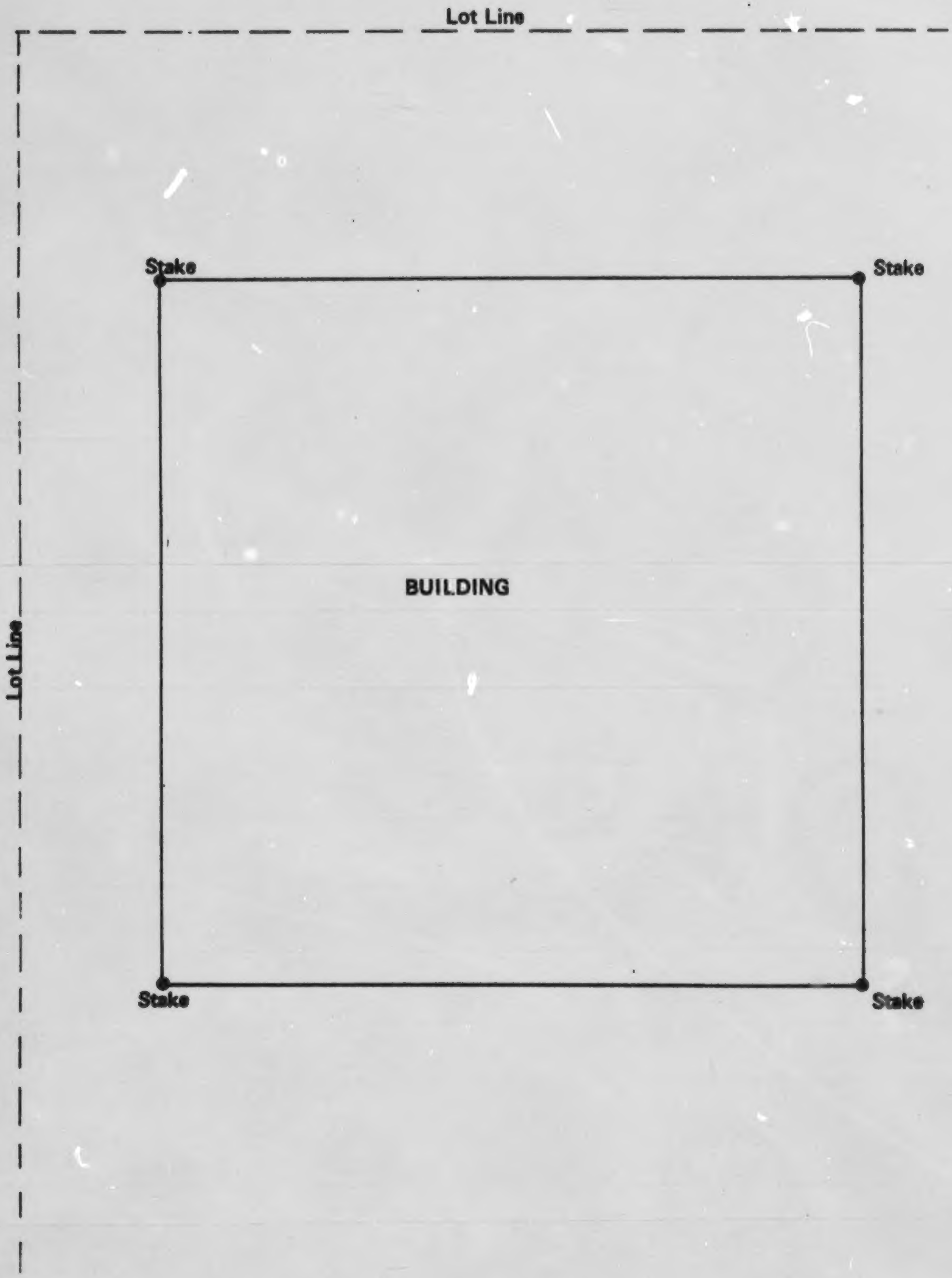
RESOURCE:

Modern Carpentry, Wagner.

PROCEDURE:

1. Read pages 87-90 in Modern Carpentry.
2. Obtain the specifications for excavation.
3. Determine cubic yards of dirt to be removed from the excavation using the accepted formula.
4. Have the computation evaluated.
5. Take the LAP test.

Principal Author(s): R. Arneson


Lot Line
Lot Line
Stake
Stake
Stake
Stake
BUILDING

Student: ______________________ File Code: 70.01.01.06. A2-2

Date: ______________________ Date Published: 6/27/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: QUANTITY OF DIRT TO BE REMOVED FROM SITE

1. When figuring cubic yards how many cubic feet are in a cubic yard?

   a. 27.
   b. 9.
   c. 14.
   d. 3.

2. A cubic yard of dirt contains how many cubic feet of dirt?

   a. 19.
   b. 9.
   c. 3.
   d. 27.

3. If a house has dimensions of 10' x 20' and the bottom of the footing is 3' down from finish grade, how much dirt will be removed? (Allow 2' all the way around for working)

   a. 37.3 cubic yds.
   b. 27 cubic feet.
   c. 25 cubic yds.
   d. 100 cubic feet.

4. What is the depth from the top of the garage foundation to the bottom of the footing? (See plan section C-C)

   a. 9'1"
   b. 8'1"
   c. 5'4"
   d. 6'0"

5. What is the width of the garage foundation? (See plan section C-C)

   a. 8"
   b. 12"
   c. 1'8"
   d. 18"

6. What is the width of the garage foundation wall? (See plan section C-C)

   a. 6"
   b. 20"
   c. 12"
   d. 8"

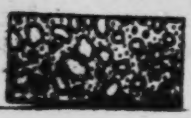
7. What is the height of the garage foundation wall ? (See plan section C-C)

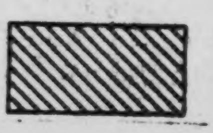
   a. 6'0"
   b. 8"
   c. 5'4"
   d. 54"

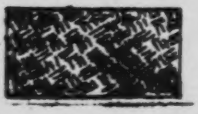
8. How wide would the trench have to be dug for installing the garage foundation? (See plan section C-C)

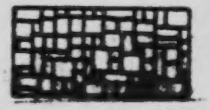
   a. 1'
   b. 2'
   c. 4'
   d. 3'

9. Which of the following is a symbol for earth?

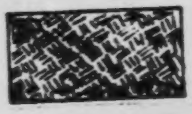
A


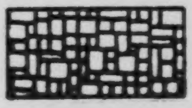
C


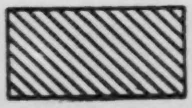
B


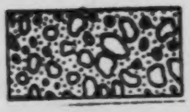
D


10. Which of the following is a symbol for concrete?

A


C


B


D


LAP TEST ANSWER KEY: QUANTITY OF DIRT TO BE REMOVED FROM SITE

TO BE [illegible]ED FROM SITE

1. A
2. D
3. A
4. D
5. C
6. D
7. C
8. C
9. B
10. D

File Code: 70.01.01.07.A2-0

Date Published: 8/15/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Quantity of Concrete Required

OBJECTIVE:

Determine the cubic yards of concrete required for specified jobs.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

PROCEDURE:

1. Read pages 87-110 in Modern Carpentry.
2. Obtain specifications for the attached sketch.
3. Determine the cubic yards of concrete for the following assignments.
   A. 2 foot foundation
   B. 4 foot foundation
   C. 8 foot basement
4. Have your completed assignment evaluated.
5. Take the LAP test.

Principal Author(s): R. Arneson

Student: ______________________ File Code: 70.01.01.07. A2-2

Date: ______________________ Date Published: 6/27/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: QUANTITY OF CONCRETE REQUIRED

1. The standard unit of measure of concrete is the:

   a. cubic inch.
   b. square inch.
   c. cubic foot.
   d. cubic yd.

2. How many cubic feet are in a cubic yard of concrete?

   a. 9
   b. 27
   c. 3
   d. 12

3. How much concrete will it take to pour footing 10' long, 1' thick and 1' wide?

   a. 2 cubic yds.
   b. 1/2 cubic yd.
   c. 1 cubic yd.
   d. 1/3 cubic yd.

4. How much concrete will it take to pour a wall 8" thick, 10' long, and 2' high?

   a. 50 cubic yds.
   b. 5 cubic yds.
   c. .5 cubic yds.
   d. 2.5 cubic yds.

5. How much concrete will it take to pour the wall on the NW side of the garage, approx? (See plan)

   a. 2.72 cubic yds.
   b. .272 cubic yds.
   c. 272 cubic yds.
   d. 27.2 cubic yds.

6. How many yards of concrete will a wall 20' x 3' x 8" require?

   a. 3.0 yds.
   b. 2.75 yds.
   c. 1.48 yds.
   d. 5.6 yds.

7. How many yards of concrete would be needed for a wall 25' x 2' x 6" and footing 25' x 1' x 6" ?

   a. .5 yds.
   b. 1.4 yds.
   c. 3.7 yds.
   d. 8.2 yds.

8. What is the thickness of the house footing? (See plan section A-A)

   a. 6"
   b. 10"
   c. 2'
   d. 1'

9. What is the width of the house footing? (See plan section A-A)

   a. 16"
   b. 1'
   c. 2'
   d. 1'6"

10. What is the height of the house foundation wall? (See plan section A-A)

   a. 8'3"
   b. 8'7"
   c. 8'1"
   d. 8'0"

LAP TEST ANSWER KEY: **QUANTITY OF CONCRETE REQUIRED**

1. D
2. B
3. D
4. C
5. D
6. C
7. B
8. D
9. C
10. B

File Code: 70.01.01.08.A2-0

Date Published: 8/15/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________

Date: ______________

PERFORMANCE ACTIVITY: Types of Concrete and Their Use

OBJECTIVES:

List five types of concrete and identify their specific uses.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCE:

Concrete Technology, Portland Cement Association.

PROCEDURE:

1. Read pages 20-22 in Concrete Technology.
2. Make a list of the types of concrete.
3. List their specific uses.
4. Take the LAP test.

Principal Author(s): R. Arneson

Student: ______________________ File Code: 70.01.01.08. A2-2

Date: ______________________ Date Published: 6/27/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: TYPES OF CONCRETE AND THEIR USE

IR USE

1. What do the letters ASTM stand for?

   a. American Society of Testing Mechanics.
   b. American Society for Test Materials.
   c. American Society ofThermal Mechanics.
   d. American Society of Technical Mechanics .

2. Portland cement is which of the following?

   a. company name.
   b. brand name.
   c. type.
   d. patent name.

3. Which type of cement has the characteristic of low heat hydration and resistance to sulfate attack. .

   a. type III.
   b. type I.
   c. type II.
   d. type IV.

4. The type of cement which has the characteristics suitable for normal use is:

   a. type I.
   b. type II.
   c. type III.
   d. type IV.

5. Of the following types of cement, which has the characteristic of severe sulfate resistance?

   a. type V.
   b. type IV.
   c. type II.
   d. type I

6. Of the following types of cement, which has the characteristic of minimal low heat hydration?

   a. type II.
   b. type V.
   c. type III.
   d. type IV.

7. Which type of cement should be used if very rapid strength is needed?

   a. type III.
   b. type II.
   c. type I.
   d. type IV.

8. Which type of cement has both low heat hydration and sulfate acid resistance?

   a. type IV.
   b. type I.
   c. type II.
   d. type V.

9. The type of cement that has a characteristic of air entrainment would have which letter(s) after the type?

   a. (AV)
   b. A/E
   c. (AS)
   d. (A)

10. A type of cement that has the characteristic of resistance to chemical de-icers would be identified by the letter(s):

    a. II A/E
    b. I A
    c. I A/E
    d. II A/S

LAP TEST ANSWER KEY: TYPES OF CONCRETE AND THEIR USE

THEIR USE

1. B
2. C
3. C
4. A
5. A
6. D
7. A
8. C
9. D
10. B

File Code: 70.01.01.09.A2-0

Date Published: 8/15/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Placing Concrete in a Form

OBJECTIVE:

Identify acceptable procedure for placing concrete in a form.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCE:

Concrete Technology, Portland Cement Association.

PROCEDURE:

1. Read pages 82-85 in Concrete Technology.
2. Take the LAP test.

Principal Author(s): R. Arneson

Student: ______________________ File Code: 70.01.01.09. A2-2

Date: ______________________ Date Published: 6/27/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: PLACING CONCRETE IN A FORM

1. The term referring to the placement of concrete as near to its finished location as possible is:

   a. pouring.
   b. spotting.
   c. finishing.
   d. bucking.

2. In using the concrete forms, it is essential that they be adequately:

   a. vinyl covered.
   b. painted.
   c. surfaced.
   d. braced.

3. To have a result of good concrete it is essential that the concrete be:

   a. poured.
   b. compacted.
   c. leveled.
   d. finished.

4. One thing that should not be done to cement is:

   a. to place it.
   b. to drag it.
   c. to finish it.
   d. to towel it.

5. The term referring to the vibration of concrete is:

   a. placing.
   b. finishing.
   c. consolidating.
   d. pouring.

6. When placing concrete in forms, the layers should be what distance?

   a. 2" - 6"
   b. 12" - 18"
   c. 6" - 10"
   d. 2' - 4'

7. When rocks are exposed in a form after the concrete has hardened, it is referred to as:

   a. latis.
   b. honeycomb.
   c. entrainment.
   d. chloride.

8. The process of chemical action of the hardening of concrete is called:

   a. hardening.
   b. setting.
   c. hydration.
   d. entrainment.

9. How is conbrete strength affected when it drops too far?

   a. it separates.
   b. gains strength.
   c. hardens slowly.
   d. it hardens rapidly.

10. Concrete should not be dropped over what distance?

   a. 4'
   b. 2'
   c. 1'
   d. 3'

LAP TEST ANSWER KEY: PLACING CONCRETE IN A FORM

1. B
2. D
3. B
4. B
5. C
6. B
7. B
8. C
9. D
10. A

File Code: 70.01.01.10.A2-0

Date Published: 8/15/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Use and Purpose of Additives

OBJECTIVE:

Identify purposes of additives in concrete.

EVALUATION PROCEDURE:

Meet the criteria listed in the resource material.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCE:

Concrete Technology, Portland Cement Association.

PROCEDURE:

1. Read pages 36-40 and 120 in Concrete Technology.
2. Take the LAP test.

Principal Author(s): R. Arneson

Student: ____________________ File Code: 70.01.01.10. A2-2

Date: ____________________ Date Published: 6/28/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: USE AND PURPOSE OF ADDITIVES

1. When temperatures fall below what level, it becomes necessary to take special precautions to prevent freezing.

   a. 32 degrees.
   b. 38 degrees.
   c. 36 degrees.
   d. 40 degrees.

2. The process of hydration is stopped when what factor is missing?

   a. form ties.
   b. aggregate.
   c. forms.
   d. moisture.

3. Which type of cement provides high early strength?

   a. type II.
   b. type III.
   c. type I.
   d. type IV.

4. An adimixture used to increase setting time is called:

   a. calcium chloride.
   b. air entrainment.
   c. water.
   d. oil.

5. What is the recommended percentage of calcium chloride that should be added to concrete?

   a. 1%
   b. 2%
   c. 3%
   d. 4%

6. If aluminum conduit is installed in concrete, what element should not be used?

   a. air entrainment.
   b. water.
   c. calcium chloride.
   d. coloring.

7. If concrete will contact soil containing sulfates, what should not be used in the concrete?

   a. concrete adimixture.
   b. air entrainment.
   c. calcium chloride.
   d. concrete coloring.

8. The most commonly used adimixture is:

   a. calcium chloride.
   b. hydration.
   c. hydroxide.
   d. uretheae.

9. Calcium chloride should be added to concrete in:

   a. liquid form.
   b. powder form.
   c. liquid form with coloring.
   d. air entrainment.

10. What is the maximum per cent of calcium chloride that **should be added** to cement?

    a. 1%
    b. 3%
    c. 2%
    d. 4%

LAP TEST ANSWER KEY: USE AND PURPOSE OF ADDITIVES

1. D
2. D
3. B
4. A
5. A
6. C
7. C
8. A
9. A
10. C

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.01.11.A2-0

Date Published: 8/15/75

Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Curing Concrete

OBJECTIVES:

State the procedure to follow when correctly curing concrete.

Identify characteristics of concrete while in curing process.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCE:

Concrete Technology, Portland Cement Association.

PROCEDURE:

1. Read pages 92-96 in Concrete Technology.
2. Take the LAP test.

Principal Author(s): R. Arneson

Student: ____________________ File Code: 70.01.01.11. A2-2

Date: ____________________ Date Published: 6/28/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: CURING CONCRETE

1. A chemical action that occurs between water and portland cement is called:

   a. hydration.
   b. calcium chloride.
   c. sulfation.
   d. air entrainment.

2. Proper curing of concrete for 7 days will increase concrete strength by approximately what percentage?

   a. 30%
   b. 10%
   c. 20%
   d. 50%

3. The average period of time required for general curing of concrete is:

   a. up to two weeks.
   b. up to one day.
   c. up to a month.
   d. up to one week.

4. For the first three days the temperature of curing should be approximately:

   a. 35 degrees.
   b. 50 degrees.
   c. 40 degrees.
   d. 70 degrees.

5. The most favorable curing temperature range is:

   a. 55 degrees - 90 degrees.
   b. 40 degrees - 70 degrees.
   c. 50 degrees - 80 degrees.
   d. 55 degrees - 73 degrees.

6. When the temperature of curing falls below what level, hydration of concrete stops.

   a. 40 degrees.
   b. 33 degrees.
   c. 42 degrees.
   d. 45 degrees.

7. What is the minimum number of days needed for curing before the strength of concrete will double?

   a. 28 days.
   b. 7 days.
   c. 14 days.
   d. 21 days.

8. Twenty-eight days of moist curing concrete will do what to the strength of the concrete.

   a. triple it.
   b. double it.
   c. quadruple it.
   d. lessen it.

9. Curing concrete with wet burlap is called.

   a. climatic.
   b. steam vapor .
   c. water retaining.
   d. atmospheric.

10. Curing concrete with a chemical membrane uses which curing principle?

   a. climatic curing.
   b. steam vapor curing.
   c. water retaining curing.
   d. atmospheric curing.

LAP TEST ANSWER KEY: CURING CONCRETE

1. A
2. D
3. B
4. C
5. D
6. D
7. D
8. D
9. B
10. A

File Code: 70.01.01.12.A2-0

Date Published: 8/15/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Footing Lines

OBJECTIVES:

Lay out footing lines according to specifications.

Identify characteristics of footing and construction.

EVALUATION PROCEDURE:

Footing line layout meets the criteria on the checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Line
Maul
Tape Measure (100 ft.)

PROCEDURE:

1. Read pages 71-110 in Modern Carpentry.
2. The instructor will dimension the attached blueprint.
3. Obtain the required tools and materials to layout footing lines.
4. Lay out lines for the footings according to the specifications.
5. Drive stakes and pull lines on the layout.
6. Take the LAP test.

Principal Author(s):

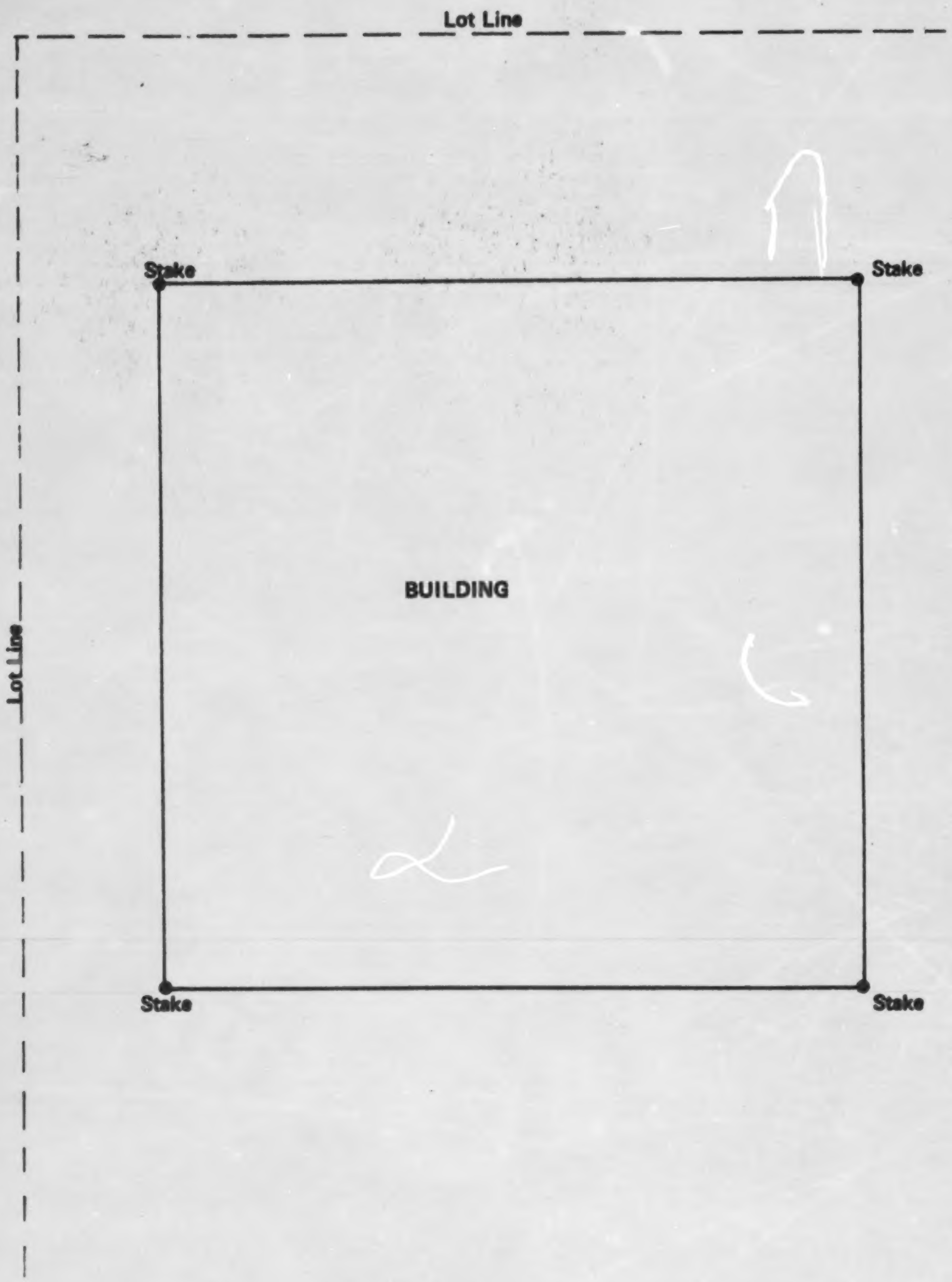
R. Arneson

CHECKLIST: FOOTING LINES

_____ Accurate measurements to ± ½".

_____ Square Diagonals to ± ½".

_____ Stakes are driven solidly.


Lot Line
Stake
Stake
BUILDING
Lot Line
Stake
Stake

Student: ____________________ File Code: 70.01.01.12. A2-2

Date: ____________________ Date Published: 6/28/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: FOOTING LINES · _INES

1. The ability of concrete to resist twisting is called:

   a. density.
   b. compressive strength.
   c. compression strength.
   d. tensile strength.

2. The ability of concrete to resist crushing is referred to as:

   a. tensile strength.
   b. compressive strength.
   c. density strength.
   d. massive strength.

3. In the footing illustration, which letter would correspond to the footing width?

   a. 1
   b. 3
   c. 2
   d. 4

4. In the typical footing illustration, which letter would correspond to the spreader?

   a. 1
   b. 2
   c. 3
   d. 4

5. In the typical footing illustration, which letter would correspond to the batter board?

   a. 2
   b. 1
   c. 3
   d. 4

6. In the typical footing illustration, which letter would correspond to the footing form?

   a. 8
   b. 5
   c. 6
   d. 7

7. Splayed footing is sometimes referred to as:

   a. tapered footing.
   b. square footing.
   c. rectangular footing.
   d. triangular footing.

8. A footing that is formed with vertical sides and horizontal surfaces is called:

   a. rectangular footing.
   b. square footing.
   c. polygonal footing.
   d. T-footing.

9. The vertical portion of a T-type form is called:

   a. the footing.
   b. the plaster board.
   c. the stem.
   d. the keyway.

10. The types of nails used to set footing forms are generally:

    a. the galvanized box.
    b. the duplex head.
    c. the finish nail.
    d. the barbed nail.

LAP TEST ANSWER KEY: **FOOTING LINES**

1. D
2. B
3. C
4. D
5. B
6. D
7. A
8. A
9. D
10. D

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.01.13.A2-0

Date Published: 8/15/75

Learning Activity Package

Student:

Date:

PERFORMANCE ACTIVITY: Anchoring to Concrete

OBJECTIVES:

Sketch two methods used to anchor materials to concrete.

Identify methods used in anchoring to concrete.

EVALUATION PROCEDURE:

Sketches are compatible with reference material.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCE:

Modern Carpentry, Wagner.

PROCEDURE:

1. Read pages 87-110 in Modern Carpentry.
2. Make sketches of two methods used to anchor to concrete.
3. Have the sketches evaluated.
4. Take the LAP test.

Principal Author(s):
R. Arneson

Student: ______________________ File Code: 70.01.01.13. A2-2

Date: ______________________ Date Published: 6/28/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: ANCHORING TO CONCRETE

1. What is the diameter of the anchor bolts used in the garage foundation? (See plan section C-C)

   a. 5/8"
   b. 3/8"
   c. 1/2"
   d. 3/4"

2. What is the length of the anchor bolts used in the garage foundation? (See plan section C-C)

   a. 10"
   b. 12"
   c. 16"
   d. 18"

3. Anchor bolts on the garage foundation hold down what structural member? (See C-C)

   a. joist.
   b. header.
   c. rud sill.
   d. box sill.

4. A guide used to accurately drill joles in sill is called:

   a. drill.
   b. template.
   c. draw knife.
   d. drill index.

5. On the typical anchor bolt illustration, which letter would correspond to the bolt?

   a. 5
   b. 1
   c. 2
   d. 3

6. In the typical anchor bolt illustration, which letter would correspond to the nut?

   a. 3
   b. 2
   c. 1
   d. 4

7. In the typical anchor bolt illustration, which letter would correspond to the grout?

   a. 4
   b. 5
   c. 6
   d. 1

8. A device used to fasten intersecting walls in place is called:

   a. fastener.
   b. bolt.
   c. rod.
   d. anchor.

9. Anchor bolts shoud not exceed which of the following dimensions?

   a. 7'
   b. 5'
   c. 6'
   d. 4'

10. How many anchor bolts should be placed near the corners of a foundation?

   a. 4
   b. 2
   c. 3
   d. 1

LAP TEST ANSWER KEY: **ANCHORING TO CONCRETE**

1. A
2. D
3. C
4. B
5. A
6. C
7. A
8. D
9. D
10. D

File Code: 70.01.01.14.A2-0

Date Published: 8/15/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Determining Cubic Yards

OBJECTIVE:

Determine to + 2% the total yards of concrete required to complete a specified job. (Example: A basement for a house.)

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

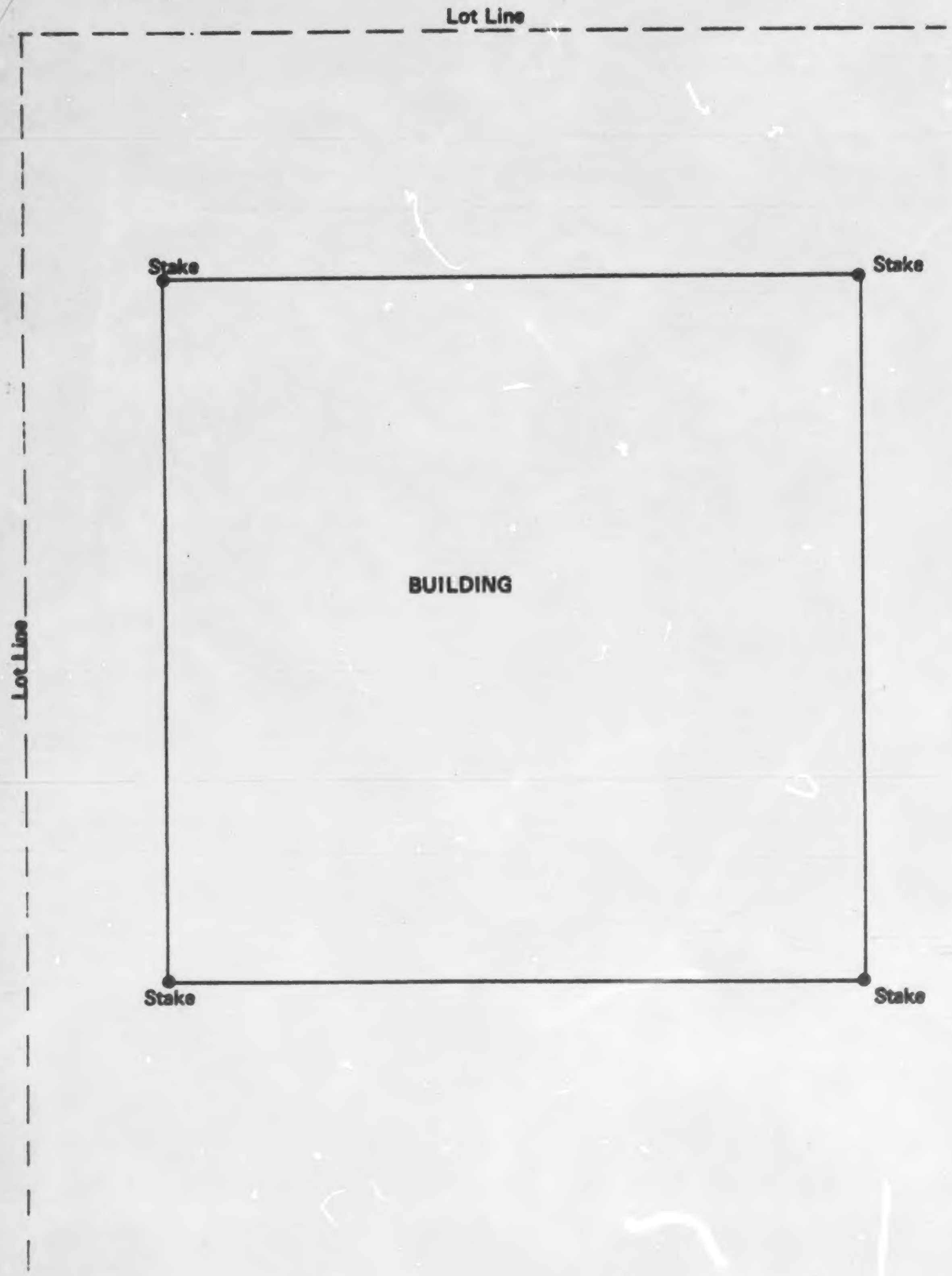
RESOURCE:

Modern Carpentry, Wagner.

PROCEDURE:

1. Read pages 87-110 in Modern Carpentry.
2. Obtain specification.
3. Using the specification provided, determine the yards of concrete needed to complete the job described.
4. Have your computations evaluated.

Principal Author(s): R. Arneson


Lot Line
Stake
Stake
BUILDING
Lot Line
Stake
Stake

Student: ______________________ **File Code:** 70.01.01.14. A2-2

Date: ______________________ **Date Published:** 6/28/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: DETERMINING CUBIC YARDS

1. How many yards of concrete will a wall 20' × 3' × 8" require?

   a. 2.75 yds.
   b. 1.48 yds.
   c. 3.0 yds.
   d. 5.6 yds.

2. Approximately how many yards of concrete will be required for footing 30' × 16" × 8" ?

   a. .5 yds.
   b. 1.7 yds.
   c. 1.0 yds.
   d. 3.5 yds.

3. How much concrete would be needed for a wall 25' × 2' × 6" and footing 25' × 1' × 6" ?

   a. 3.7 yds.
   b. .5 yds.
   c. 1.4 yds.
   d. 8.2 yds.

4. The standard unit of measure of concrete is:

   a. cubic inch.
   b. cubic yd.
   c. square inch.
   d. cubic foot.

5. How many cubic feet are in a cubic yd of concrete?

   a. 9
   b. 27
   c. 3
   d. 12

6. How much concrete will it take to pour a footing 10' long, 1' thick and 1' wide?

   a. 2 cubic yds.
   b. 1/2 of 2 cubic yds.
   c. 1 cubic yd.
   d. 1/3 of 2 cubic yds.

7. How much concrete will it take to pour a wall 8" thick, 10' long, and 2' high?

   a. 50 cubic yds.
   b. 5 cubic yds.
   c. .5 cubic yds.
   d. 2.5 cubic yds.

8. How much concrete will it take to pour the footing on the NW side of the garage? (See Plan)

   a. 1 cubic yd.
   b. 1.5 cubic yds.
   c. .5 cubic yds.
   d. 2.2 cubic yds.

9. What is the thickness of the house footing? (See plan section A-A)

   a. 10"
   b. 2'
   c. 6"
   d. 1'

10. What is the width of the house footing? (See plan section A-A)

   a. 2'
   b. 1'
   c. 16"
   d. 1'6"

LAP TEST ANSWER KEY: DETERMINING CUBIC YARDS

1. B
2. C
3. C
4. B
5. B
6. D
7. C
8. D
9. D
10. A

File Code: 70.01.01.15.A2-0

Date Published: 8/19/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________

Date: ______________

PERFORMANCE ACTIVITY: Foundation Forms

OBJECTIVE:

Sketch and describe two different methods of constructing concrete foundation forms.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

PROCEDURE:

1. Read pages 87-110 in Modern Carpentry.
2. Answer the questions at the end of the chapter, p. 110.
3. Using the reference, sketch two methods of installing foundation forms.
4. Write a description of how you would install the two different types. (NOTE: Include every step.)
5. Have the instructor evaluate your foundation description.
6. Take the LAP test.

Principal Author(s): R. Arneson

Student: ______________________ **File Code:** 70.01.01.15. A2-2

Date: ______________________ **Date Published:** 6/28/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: FOUNDATION FORMS

1. Which one of the following numbers would correspond to a monolithic foundation? Use the illustration of types of foundations.

   a. 1
   b. 2
   c. 3
   d. 4

2. Which one of the following numbers would correspond to a battered foundation? Use the illustration of types of foundation.

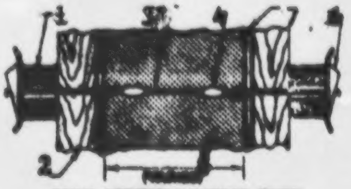
   a. 1
   b. 3
   c. 4
   d. 2

3. Which of the following numbers would correspond to a bearing wall foundation? Use the illustration of types of foundation.

   a. 4
   b. 3
   c. 5
   d. 1

4. Which one of the following number would correspond to a flared or tapered foundation? Use the illustration of types of foundation.

   a. 4
   b. 5
   c. 1
   d. 2



FORM ASSEMBLY (WEDGE-TYPE)

5. Using the form assembly (wedge type) illustration, which number corresponds to the waler of the form assembly?

   a. 3
   b. 2
   c. 1
   d. 4

6. Using the form assembly (wedge type) illustration, whichnumber corresponds to the stud of the form assembly?

   a. 3
   b. 2
   c. 4
   d. 5

7. Using the form assembly (wedge type) illustration, which number corresponds to the rod of the form assembly?

   a. 3
   b. 4
   c. 5
   d. 6

8. Using the form assembly (wedge type) illustration, which number corresponds to the break back of the form assembly?

   a. 6
   b. 5
   c. 4
   d. 7

9. The collapse of column forms:

   a. all of the below.
   b. can be prevented.
   c. is a hazard to personnel.
   d. is caused by not considering the weight of the concrete.

10. There are several methods used to locate corners with the most acceptable way being:

    a. measure and compare the diagonals of opposite corners.
    b. measure from corner to corner.
    c. restake at lower level of wall.
    d. plumb down from building lines off batterboards.

LAP TEST ANSWER KEY: FOUNDATION FORMS

1. A
2. D
3. B
4. A
5. C
6. B
7. A
8. C
9. A
10. D

File Code: 70.01.01.16.A2-0

Date Published: 8/19/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Bulkheads

OBJECTIVE:

Install bulkheads in an existing form following plans and specifications.

EVALUATION PROCEDURE:

Meet the criteria of the attached checklist for installed bulkheads.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Claw Hammer
Combination square
Power hand saw
Spirit level
Tape measure (12ft.)

PROCEDURE:

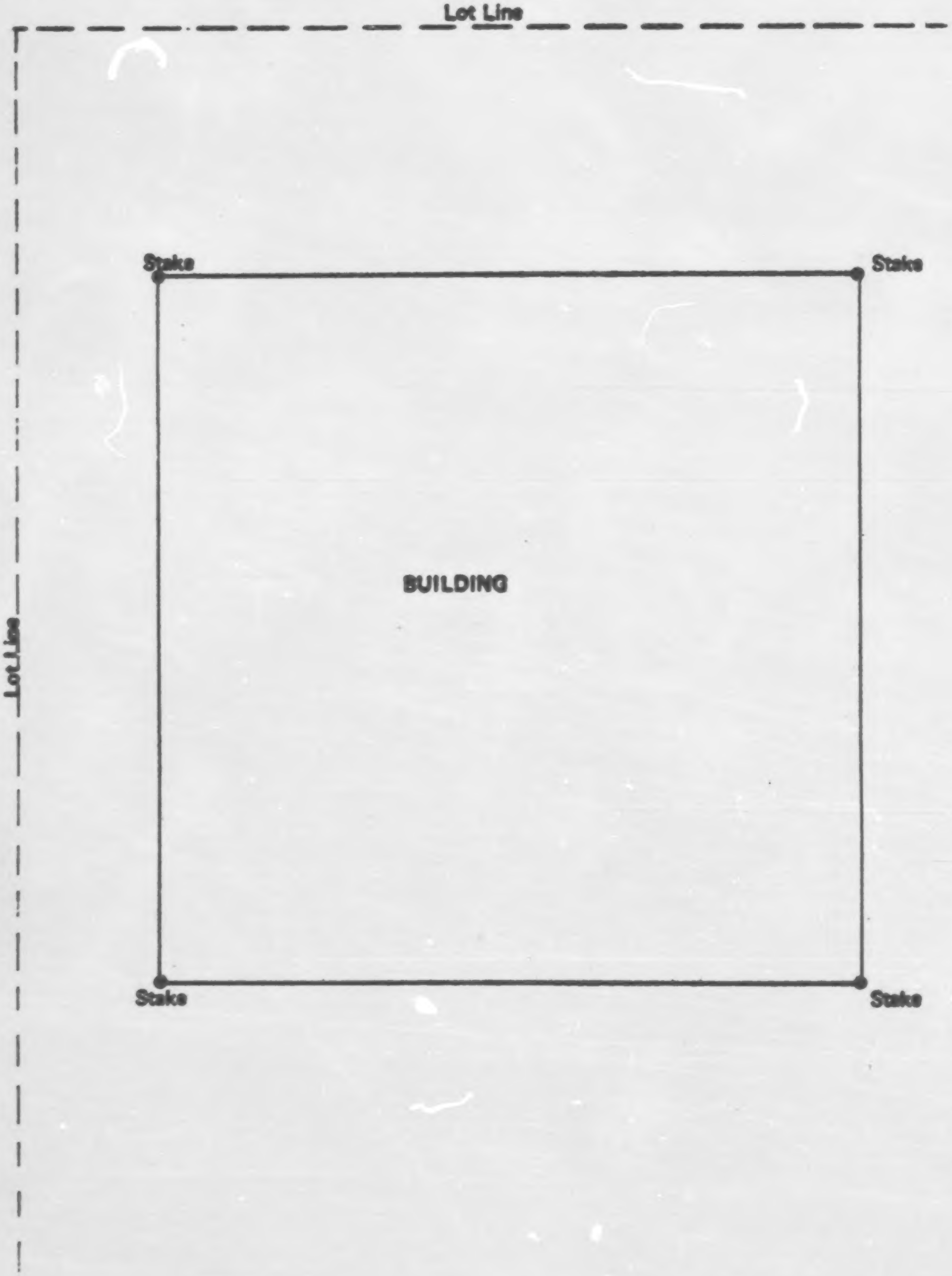
1. Review pages 87-110 in Modern Carpentry.
2. Have the instructor dimension the plan for bulkhead location.
3. Obtain the necessary tools, equipment and materials.
4. Install the bulkhead(s) according to the specifications.
5. Have the installation evaluated.

Principal Author(s): R. Arneson

CHECKLIST: BULKHEADS

_____ Level and plumb

_____ Accurate measurement to ± 1/2".

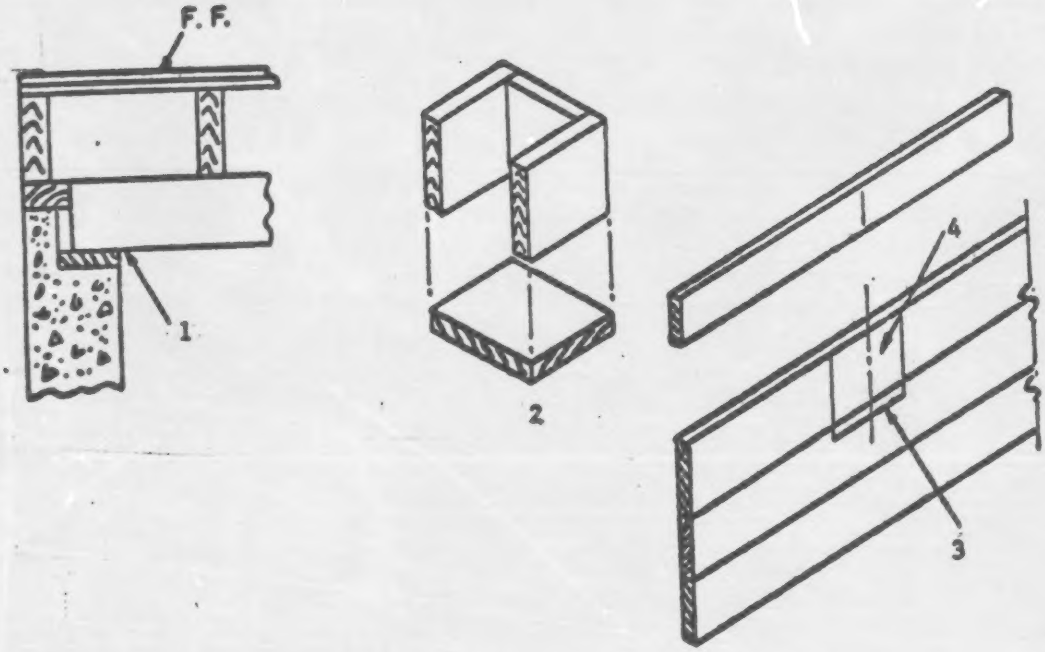

Lot Line
Lot Line
Stake
Stake
BUILDING
Stake
Stake

Student: ______________________________ File Code: 70.01.01.16. A2-2

Date: ______________________________ Date Published: 6/28/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: BULKHEADS



Beam Pocket

1. In the illustration of a beam pocket, **which number would correspond** to the bottom of the girder or beam?

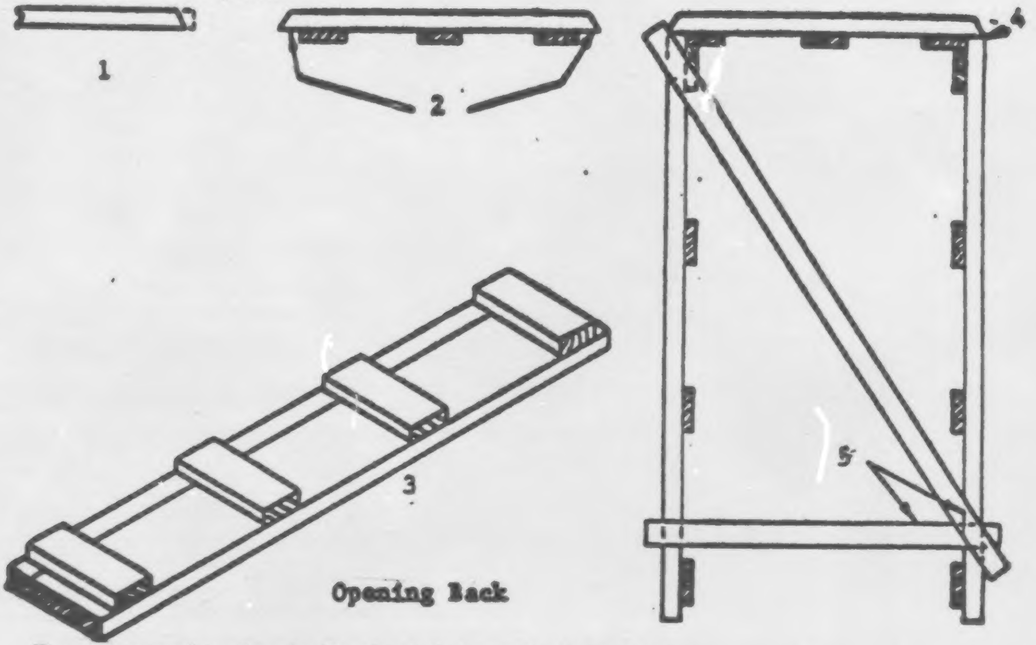
   a. 2
   b. 1
   c. 3
   d. 4

2. Using the beam illustration, which number would correspond to the bottom of the beam pocket?

   a. 1
   b. 2
   c. 3
   d. 4

3. Where should the head piece be placed, when framing the opening back?

   a. dado into side pieces.
   b. into side pieces.
   c. cleated into side pieces.
   d. over side pieces.



Opening Back

4. On an opening back the header ends should be:

   a. rabbeted.
   b. square.
   c. leveled.
   d. dadoed.

5. In the illustration the number that indicates how the header of an opening back should look is which of the following?

   a. 2
   b. 1
   c. 3
   d. 4

6. In the illustration of the opening back, the number that corresponds to how cleats should be installed on header pieces is which of the following?

   a. 4
   b. 3
   c. 2
   d. 1

7. How far should the nail cleats on header pieces be back from the header end on opening backs ?

   a. the thickness of the opening.
   b. the thickness of the wall.
   c. the thickness of the side pieces.
   d. the thickness of rough opening.

8. On the opening back illustration, the number that shows position of nail cleats is which of the following?

   a. 1
   b. 4
   c. 5
   d. 3

9. On the opening back illustration, the member that holds squareness is identified by which number?

   a. 5
   b. 1
   c. 2
   d. 3

10. Which tool is used to install opening backs?

    a. level transit.
    b. transit.
    c. level (head)
    d. rod.

LAP TEST ANSWER KEY: **BULKHEADS** HEADS

1. B
2. C
3. D
4. C
5. B
6. C
7. C
8. D
9. A
10. C

File Code: 70.01.01.17.A2-0

Date Published: 8/20/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student:

Date:

PERFORMANCE ACTIVITY: Set Reinforcing Steel

OBJECTIVE:

Construct a grid of reinforcing steel given a plan and specifications.

EVALUATION PROCEDURE:

Meet the criteria of the attached checklist for installing reinforcing steel.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Hack saw.
Side cutter.
Tape measure (12 ft.).

PROCEDURE:

1. Review pages 87-110 in Modern Carpentry.
2. Have the instructor label the positioning of the steel on the attached plan.
3. Obtain the necessary tools and materials.
4. Install the steel following recommended practices, procedures and the plan.
5. Have the installation evaluated.
6. Take the LAP test.

Principal Author(s): R. Arneson

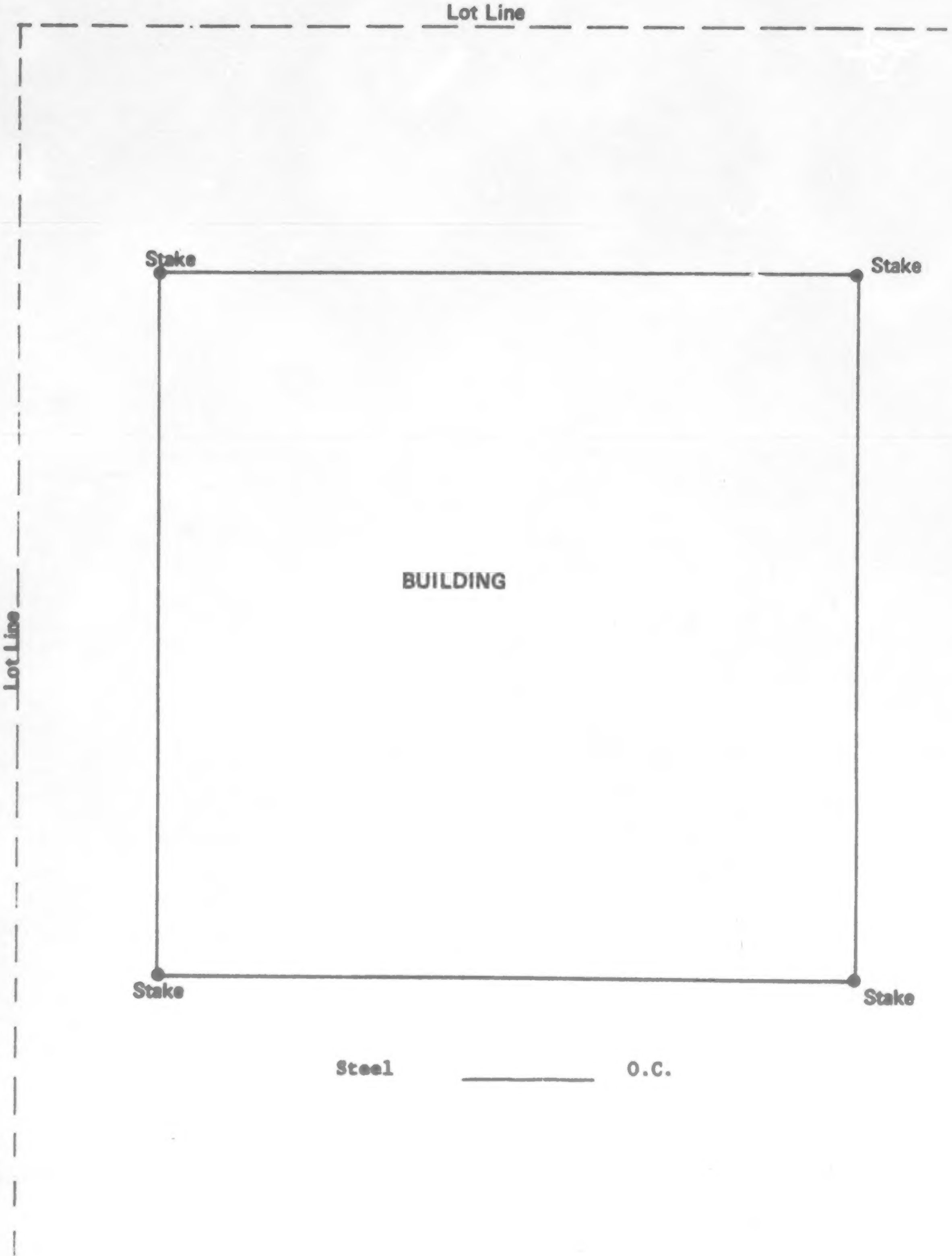
CHECKLIST: REINFORCING STEEL

_____ Steel is positioned according to the plan.

_____ Accurate measurements.

_____ Followed recommended practices and procedures.

_____ Ties are solid.


Lot Line
Stake
Stake
BUILDING
Lot Line
Stake
Stake

Steel ____________ O.C.

Student: ____________________ File Code: 70.01.01.17. A2-2

Date: ____________________ Date Published: 6/28/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: SET REINFORCING STEEL

1. Which type of concrete strength is 10 times as strong as any other strength?
   a. load.
   b. tensile.
   c. compressive.
   d. variance.

2. Reinforcement steel increases concrete:
   a. compressive strength.
   b. tensile strength.
   c. load strength.
   d. variance strength.

3. Tensile strength refers to:
   a. load.
   b. crushing.
   c. bending.
   d. variance

4. Which of the following concrete strengths has the ability to stop from being pulled apart?
   a. load.
   b. compressive.
   c. tensile.
   d. variance.

5. The most common reinforcement material used in concrete is made of:
   a. copper.
   b. steel.
   c. aluminum.
   d. brass.

6. Most reinforcement bars come in what lengths?

   a. 16'
   b. 20'
   c. 10'
   d. 15'

7. Where is the reinforcement steel placed in a beam?

   a. on the upper portion just past the middle.
   b. near the upper side.
   c. near the middle.
   d. near the lower side.

8. How is steel usually placed on round structures?

   a. near the middle.
   b. near the middle towards the inside.
   c. near the middle towards the outside.
   d. near the inside edge.

9. What is the minimum recommended amount of concrete coverage of steel in footing?

   a. 2"
   b. 3"
   c. 1"
   d. 4"

10. A good rule of thumb to keep in mind when determining bar lap is to multiply bar diameter by:

    a. 24.
    b. 10
    c. 12
    d. 16

LAP TEST ANSWER KEY: SET REINFORCING STEEL

1. C
2. B
3. C
4. C
5. B
6. B
7. D
8. C
9. B
10. A

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.01.18.A2-0

Date Published: 8/20/75

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Determining Yards of Foundation

OBJECTIVE:

Given a plan for a foundation, calculate the cubic yards of concrete required.

EVALUATION PROCEDURE:

Computations accurate to ± 1% of the total.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

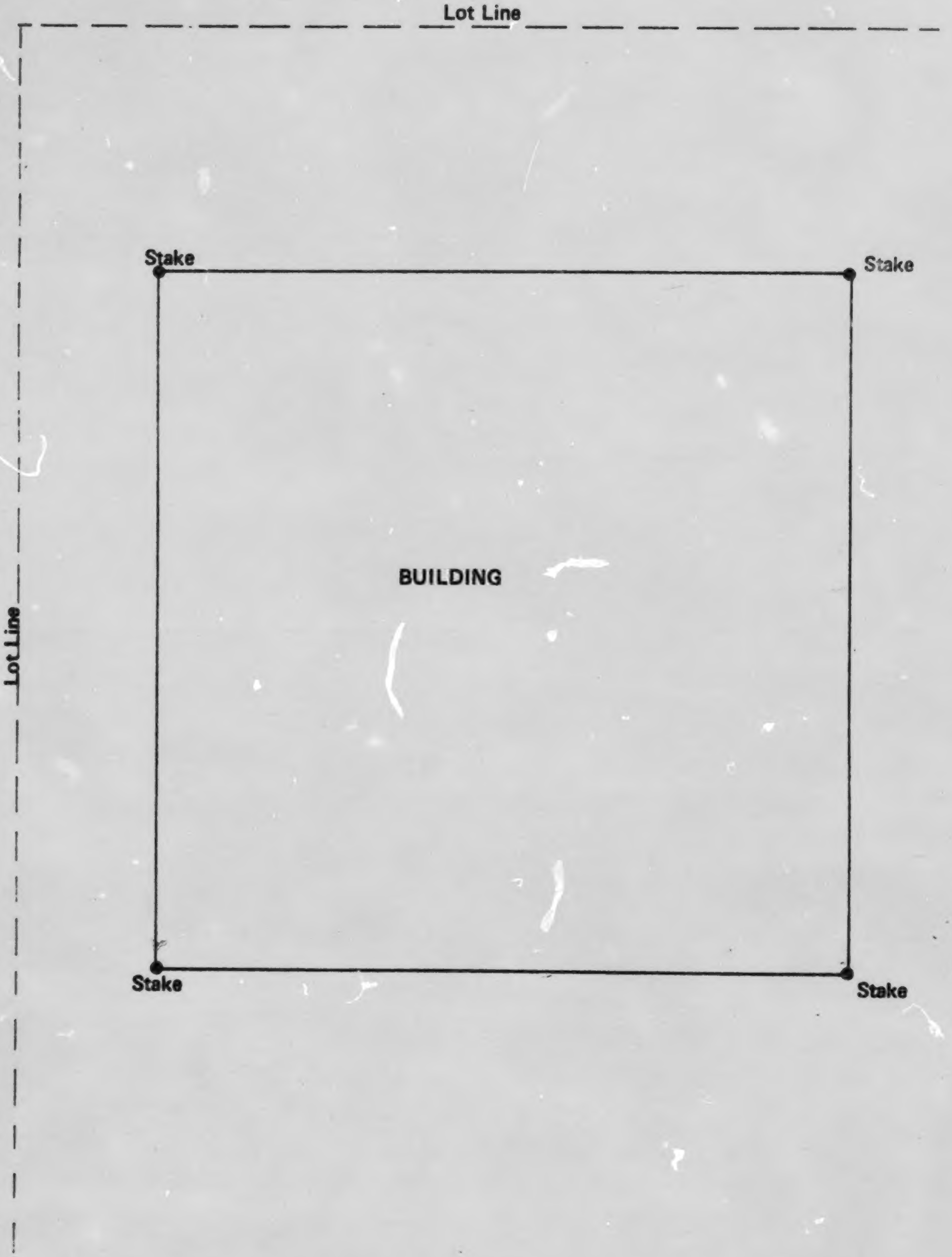
RESOURCES:

Modern Carpentry, Wagner.

PROCEDURE:

1. Review pages 87-110 in Modern Carpentry.
2. Have the instructor dimension the attached plan.
3. Using the plan compute the amount of concrete needed to pour the foundation.
4. Have the computations evaluated.
5. Take the LAP test.

Principal Author(s): R. Arneson


Lot Line
Lot Line
Stake
Stake
BUILDING
Stake
Stake

Student: ______________ File Code: 70.01.01.18. A2-2

Date: ______________ Date Published: 6/28/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: DETERMINING YARDS OF FOUNDATION

1. How many cubic feet are in a cubic yd of concrete?

   a. 9
   b. 3
   c. 27
   d. 12

2. How much concrete will it take to pour a footing 10' long, 1'thick, and 1' wide?

   a. 1/2 of a cubic yd.
   b. 1/3 of a cubic yd.
   c. 1 cubic yd.
   d. 2 cubic yds.

3. How much concrete will it take to pour the footing on the NW side of the garage, approximately? (See Plan)

   a. 1 cubic yd.
   b. 2.2 cubic yds.
   c. 1.5 cubic yds.
   d. .5 cubic yds.

4. Given a blueprint that says you have a wall 100' x 4' x 6" and footing 100' x 16" x 10" , how much concrete will it require to do the job?

   a. 9.5 yds.
   b. 10.6 yds.
   c. 15.0 yds.
   d. 11.4 yds.

5. What is the thickness of the house footing? (See plan section A-A)

   a. 10"
   b. 1'
   c. 2'
   d. 6"

6. What is the height of the house foundation wall? (See plan section A-A)

   a. 8'3"
   b. 8'1"
   c. 8'7"
   d. 8'0"

7. What is the thickness of the house foundation wall? (see plan section A-A)

   a. 8"
   b. 12"
   c. 10"
   d. 14"

8. **When ordering concrete the aggregate size cannot exceed what fraction of the minimum thickness of the member.**

   a. one-fifth.
   b. one-fourth.
   c. one-third.
   d. one-half.

9. **Aggregate size in concrete should not exceed what fraction of the distance between steel and forms.**

   a. one-half.
   b. three-fourths.
   c. one-fourth.
   d. five-eighths.

10. The term referring to the amount of concrete made with one sack of cement is:

    a. 1/2 cubic yd.
    b. one cubic yd.
    c. yield.
    d. volume.

LAP TEST ANSWER KEY: **DETERMING YARDS OF FOUNDATION**

1. C
2. B
3. B
4. D
5. B
6. C
7. B
8. A
9. B
10. C

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.01.19.A2-0

Date Published: 8/20/75

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Curing Foundations

OBJECTIVE:

Describe the recommended method of curing concrete.

EVALUATION PROCEDURE:

Description is consistent with methods in the resource material.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Concrete Technology, Portland Cement Association.

PROCEDURE:

1. Read pages 92-96 in Concrete Technology.
2. Obtain a pencil and paper.
3. Write a description that is consistent with the resource material for the recommended method of curing concrete.
4. Have theinstructor evaluate the description.
5. Take the LAP test.

Principal Author(s): R. Arneson

Student: ______________________ File Code: 70.01.01.19. A2-2

Date: ______________________ Date Published: 7/1/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: CURING FOUNDATIONS

1. A chemical action that occurs between water and portland cement is called:

   a. calcium chloride.
   b. hydration.
   c. sulfation.
   d. air entrainment.

2. In order for hydration to occur, it is necessary to prevent which of the following?

   a. sulfation.
   b. high early setting.
   c. evaporation.
   d. air entrainment.

3. **Twenty-eight days of moist curing concrete will have what effect on the strength of the concrete?**

   a. **triple it.**
   b. **double it.**
   c. **quadrouple it.**
   d. **lessen it.**

4. Mist spraying of curing concrete is referred to as which type if curing?

   a. climatic.
   b. steam.
   c. water.
   d. atmospheric.

5. Curing concrete with wet burlap is which type of curing?

   a. steam/vapor.
   b. water-retaining.
   c. climatic.
   d. atmospheric.

6. The average period of time required for general curing of concrete is:

   a. up to one week.
   b. up to one day.
   c. up to one month.
   d. up to two weeks.

7. For the first three days the temperature of curing should be approximately:

   a. 50 degrees.
   b. 70 degrees.
   c. 40 degrees.
   d. 35 degrees.

8. From 3 to 7 days, what is the minimum temperature of curing?

   a. 40 degrees.
   b. 60 degrees.
   c. 50 degrees.
   d. 35 degrees.

9. When the temperature of curing falls below what temperature, hydration of concrete stops.

   a. 40 degrees.
   b. 33 degrees.
   c. 42 degrees.
   d. 45 degrees.

10. What is the minimum number of days recommended for curing concrete?

   a. 2 days.
   b. 1 day.
   c. 7 days.
   d. 3 days.

LAP TEST ANSWER KEY: CURING FOUNDATIONS

1. B
2. C
3. B
4. C
5. B
6. A
7. B
8. C
9. B
10. C

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.01.21.A2-0

Date Published: 8/20/75

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Types of Forming

OBJECTIVE:

Describe three methods of forming concrete.

EVALUATION PROCEDURE:

Description is consistent with the resource material.

Successfuly complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCE:

Modern Carpentry, Wagner.

PROCEDURE:

1. Review pages 87-110 in Modern Carpentry.
2. Write a description of three different types of forming concrete.
3. Have the description evaluated.
4. Take the LAP test.

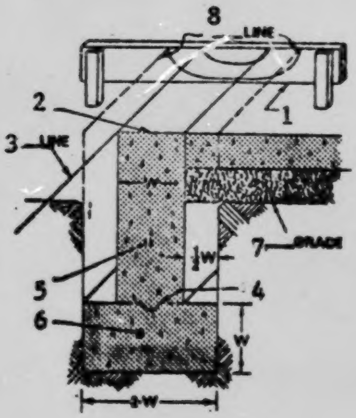
Principal Author(s): R. Arneson

Student: ______________________ File Code: 70.01.01.21. A2-2

Date: ______________________ Date Published: 7/1/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: TYPES OF FORMING



1. In the illustration of the foundation and slab, which **number would correspond** to or identify the footing line?

   a. 1
   b. 8
   c. 2
   d. 3

2. In the illustration of the foundation and slab, **which number would correspond** to or identify the natural rough grade?

   a. 7
   b. 8
   c. 1
   d. 2

3. In the illustraion of the foundation and slab, **which number would correspond** to or identify the wall reinforcing rod?

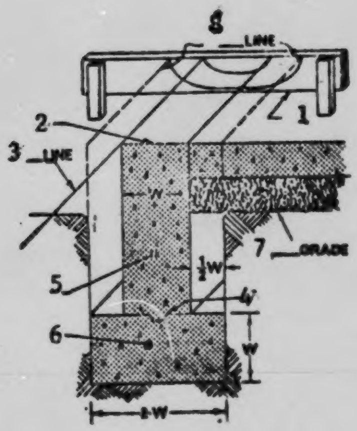
   a. 6
   b. 5
   c. 7
   d. 8

4. In the illustration of the foundation and slab, **which number would correspond** to or identify the foundation?

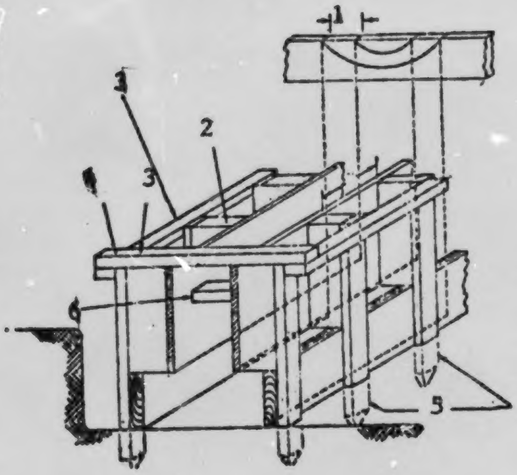
   a. 2
   b. 5
   c. 6
   d. 7

5. In the illustration of the foundation and slab, **which number would correspond** to or identify the building (foundation) line?

   a. 3
   b. 5
   c. 6
   d. 7



Foundation & Slab



Square Footing Wall

6. In the illustration of the square footing wall assembly, **which number would** correspond to spacer block?

a. 4
b. 3
c. 2
d. 5

7. In the illustration of the square footing wall assembly, **which number would** correspond to form tie?

a. 4
b. 5
c. 1
d. 2

8. In the illustration of the square footing wall assembly, which number would correspond to form stake?

a. 5
b. 6
c. 1
d. 2

9. In the illustration of the square footing wall assembly, which number would correspond to spreader (wall) ?

   a. 3
   b. 1
   c. 2
   d. 6

10. The tie that is usually used in pilasters or columns because it can be removed is the:

   a. wire/spreader tie.
   b. snap tie.
   c. taper tie.
   d. spacer/screw tie.

LAP TEST ANSWER KEY: TYPES OF FORMING

1. B
2. A
3. B
4. A
5. A
6. C
7. A
8. A
9. D
10. C

File Code: 70.01.01.22.A2-0

Date Published: 8/20/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Forming for a Slab

OBJECTIVE:

Given specifications for a slab, install the forms required for the slab.

EVALUATION PROCEDURE:

Meet the criteria of the attached checklist for slab forming.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Claw hammer.
Combination square.
Line.
Power hand saw.
Spirit level.
Tape measure (16 ft.).

PROCEDURE:

1. Review pages 87-110 in Modern Carpentry.
2. Have the instructor dimension the attached plan.
3. Obtain the required tools, equipment and materials.
4. Set the forms following the procedures outlined in the reference.
5. Have the installation evaluated.
6. Take the LAP test.

Principal Author(s): R. Arneson

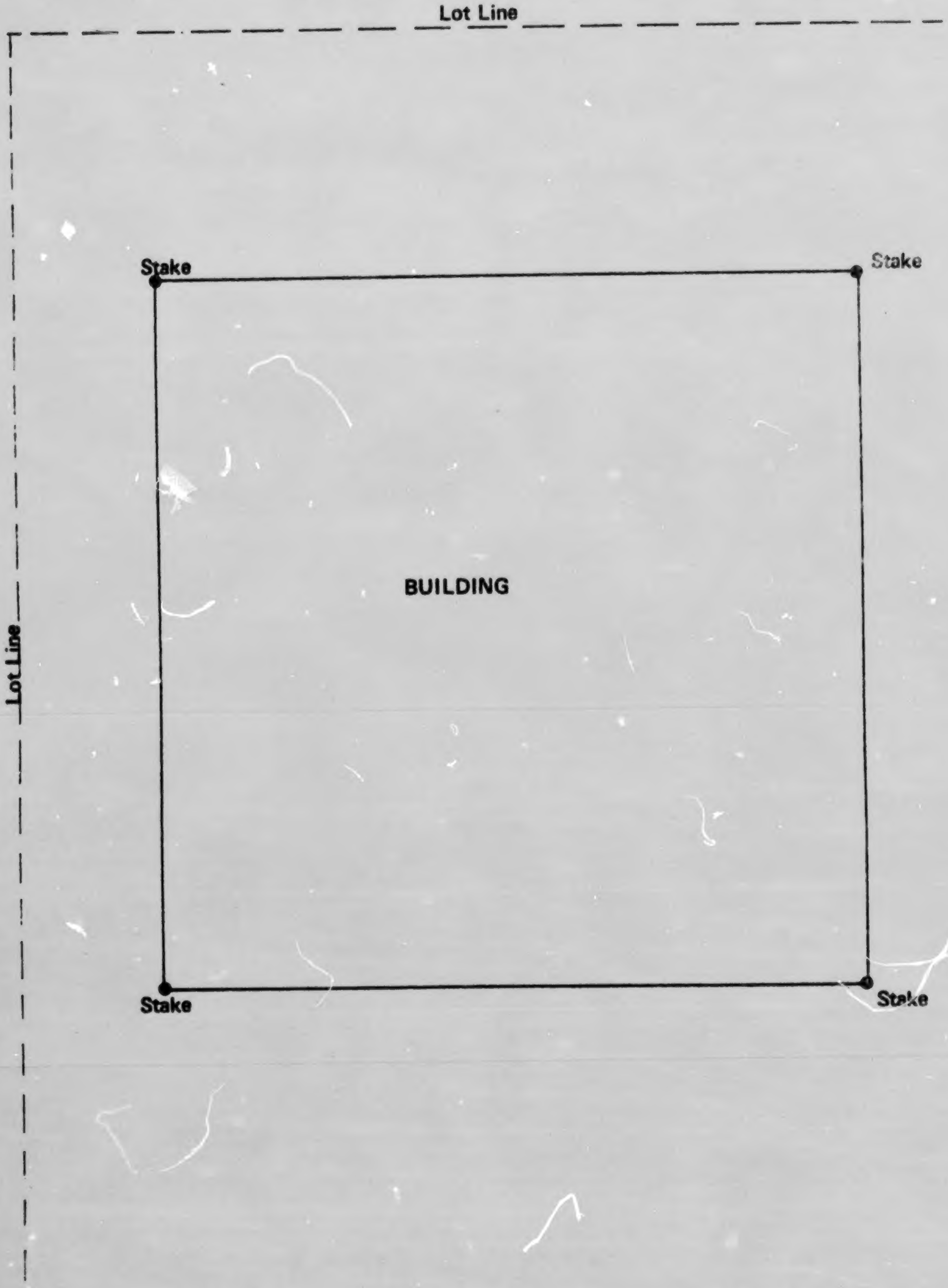
CHECKLIST: SLAB FORMING

_____ Form is square.

_____ Measurements are accurate to ± ½".

_____ Forming is substantial.

_____ Forming procedures are acceptable in the industry.


Lot Line
Lot Line
Stake
Stake
BUILDING
Stake
Stake

Student: ______________________ File Code: 70.01.01.22. A2-2

Date: ______________________ Date Published: 7/1/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: FORMING FOR A SLAB

The following 4 questions refer to the illustration **above.**

1. Using the illustration (slab-on-ground wood frame), **which number** corresponds to the under floor granular fill?

   a. 2
   b. 1
   c. 3
   d. 4

2. Using the illustration (slab-on-ground wood frame), **which number** corresponds to the tack strip?

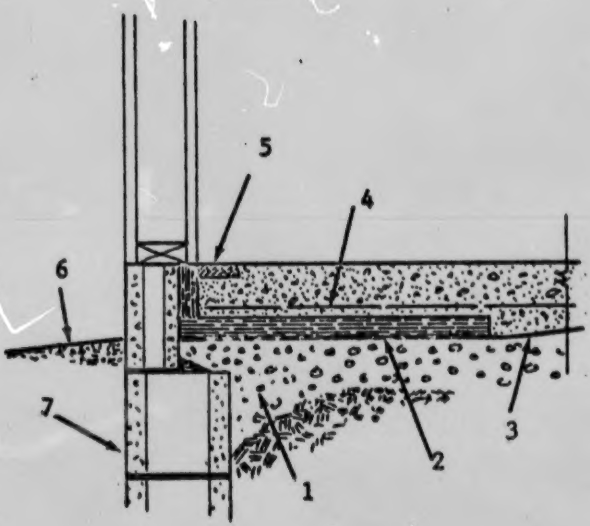
   a. 5
   b. 6
   c. 1
   d. 2

3. Using the illustration (slab-on-ground wood frame) **which number** corresponds to the metal reinforcement?

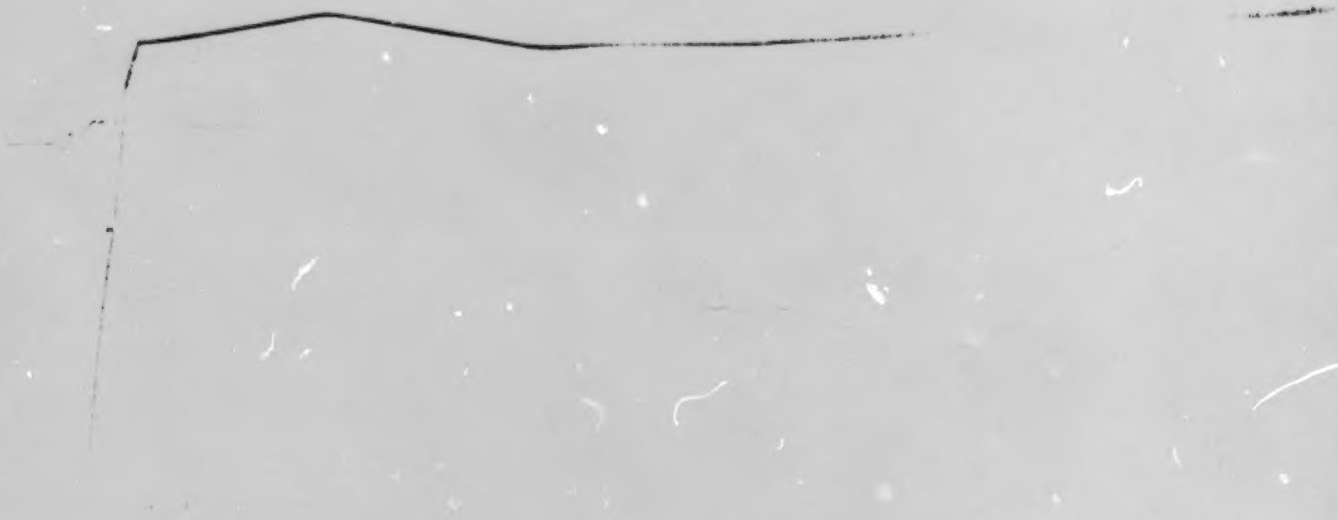
   a. 4
   b. 5
   c. 6
   d. 1

4. Using the illustration (slab-on-ground wood frame) **which number** corresponds to the outside grade?

   a. 2
   b. 4
   c. 6
   d. 3



Suggested construction for slab-on-ground when used with wood frame structure.



The following 6 questions refer to the illustration above.

5. In the illustration (details for slab-on-ground construction), **which number** corresponds to the grout coat 1:3 mix 1/2" minimum thickness?

   a. 15
   b. 13
   c. 14
   d. 12

6. In the illustration (details for slab-on-ground construction), **which number** corresponds to the outside wall footing below frost line?

   a. 13
   b. 1
   c. 2
   d. 3

7. In the illustration (details for slab-on-ground construction), which number corresponds to the strip of 15# felt under all wood partitions?

   a. 10
   b. 8
   c. 9
   d. 7

8. In the illustration (details for slab-on-ground construction), which number corresponds to the metal reinforcement weighing not less than 40 lbs. per 100 square foot?

   a. 6
   b. 7
   c. 8
   d. 9

9. In the illustration (details for slab-on-ground construction) which number corresponds to the concrete floor level?

   a. 5
   b. 2
   c. 4
   d. 3

10. In the illustration (details for slab-on-ground construction), which number corresponds to the outside grade line?

    a. 2
    b. 15
    c. 14
    d. 8

LAP TEST ANSWER KEY: FORMING FOR A SLAB

1. B
2. A
3. A
4. C
5. D
6. A
7. D
8. A
9. D
10. A

File Code: 70.01.01.23.A2-0

Date Published. 8/20/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Forming for Steps

OBJECTIVE:

Given specifications for steps, set up the forms following recommended practices and procedures.

EVALUATION PROCEDURE:

Meet the criteria of the attached checklist for step forms.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Claw hammer.
Combination square.
Framing square.
Power hand saw.
Spirit level.
Tape measure (16 ft.).

PROCEDURE:

1. Review pages 87-110 in Modern Carpentry.
2. Have the instructor fill in the attached specification sheet.
3. Obtain the required tools, equipment and materials.
4. Construct the form.
5. Have the form evaluated.
6. Take the LAP test.

Principal Author(s): R. Arneson

SPECIFICATION SHEET

1. Platform size________________________________ x ________________________.

2. Step rise___________________________________.

3. Step run_____________________________________.

CHECKLIST: STEP FORMS

_____ Form is square.

_____ Measurements are accurate to ± ¼".

_____ Forming is substantial.

_____ Forming procedures are acceptable in the industry.

Student: ______________________ File Code: 70.01.01.23. A2-2
Date: ______________________ Date Published: 7/1/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: FORMING FOR STEPS

1. If the steps are more than 3' wide when constructing concrete steps, what is the minimum thickness of the risers?

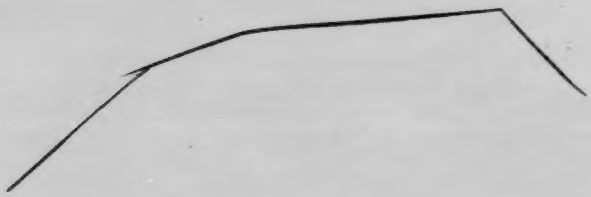
   a. 3/4"
   b. 1'
   c. 2"
   d. 3"

2. The bottom edge of step riser forms are:

   a. square.
   b. beveled.
   c. round.
   d. dadoed.

3. Measuring in from the perpendicular, what is the approximate angle step risers are usually tipped in at the bottom?

   a. 7.5 degrees.
   b. 5 degrees.
   c. 15 degrees.
   d. 10 degrees.



The following 7 questions refer to the illustration above.

4. In the illustration (steps between existing walls), **which number corresponds** to the oak plan H (stair jack reversed) ?

   a. 2
   b. 1
   c. 4
   d. 3

5. In the illustration (steps between existing walls), **which number corresponds** to the basement floor?

   a. 1
   b. 2
   c. 3
   d. 4

6. In the illustration (steps between existing walls), **which number corresponds** to the drain?

   a. 4
   b. 3
   c. 2
   d. 5

7. In the illustration (steps between existing walls), **which number would** correspond to the riser form?

   a. 3
   b. 4
   c. 5
   d. 6

8. In the illustration (steps between existing walls), **which number corresponds** to the riser brace?

   a. 5
   b. 6
   c. 7
   d. 8

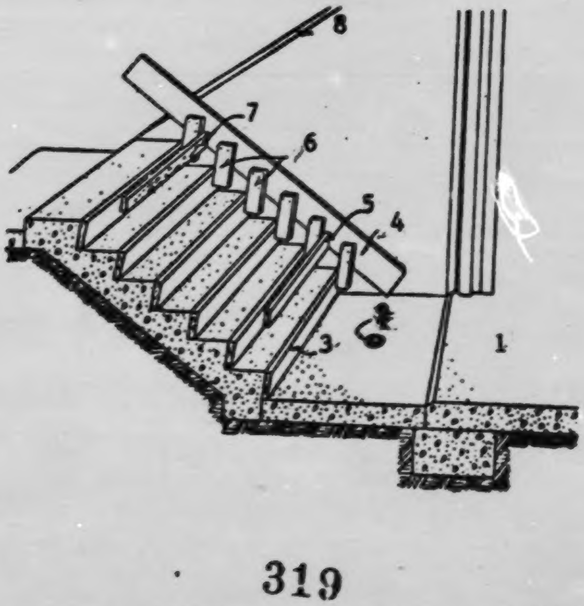
9. In the illustration (steps between existing walls), **which number corresponds** to the riser supports?

   a. 6
   b. 7
   c. 8
   d. 1

10. In the illustration (steps between existing walls) **which number corresponds** to the concrete side wall ?

   a. 8
   b. 1
   c. 2
   d. 3

Steps Between Existing Walls



LAP TEST ANSWER KEY: FORMING FOR STEPS

1. C
2. B
3. C
4. C
5. A
6. C
7. A
8. A
9. A
10. A

Mountain-Plains Education &
Economic Development
Program, Inc.

Glasgow AFB, Montana 59231

File Code: 70.01.01.24.A2-0

Date Published: 8/20/75

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Screeds for Flatwork

OBJECTIVE:

Given specifications, install the screeds needed for a concrete floor slab.

EVALUATION PROCEDURE:

Meet the criteria of the attached checklist for installed screeds.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Claw hammer.
Combination square.
Power hand saw.
Spirit level.
Tape measure (16 ft.).

PROCEDURE:

1. Review pages 87-110 in Modern Carpentry.

2. Have the instructor dimension the attached drawing.

3. Obtain the necessary tools, equipment and materials.

4. Set the screeds according to the plan following recommended procedures.

5. Have the screed installation evaluated.

6. Take the LAP test.

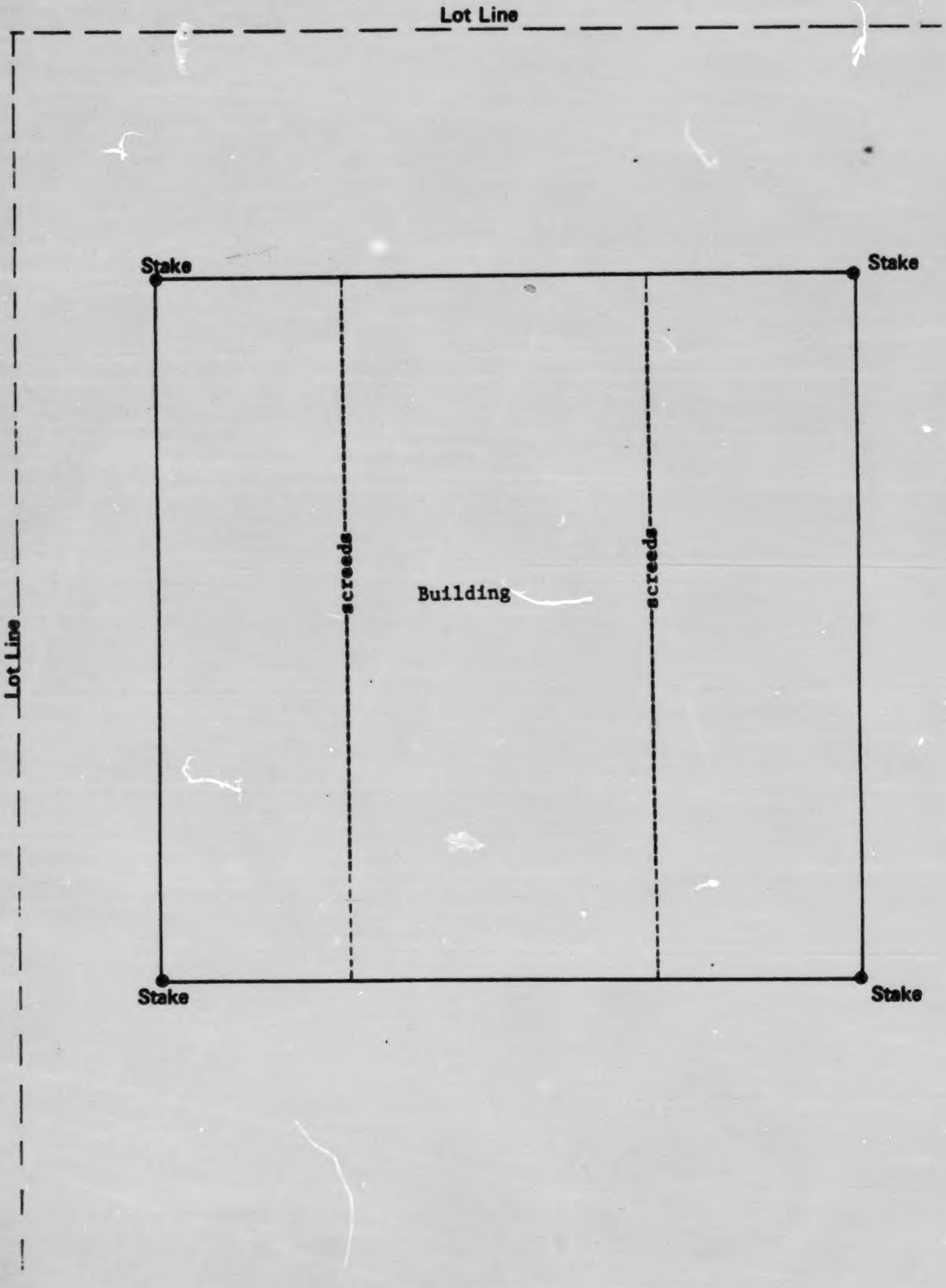
Principal Author(s): R. Arneson

CHECKLIST: INSTALL SCREEDS

_____ Screeds are straight and level.

_____ Screeds are solid.

_____ Stakes are positioned and installed properly.


Lot Line
Lot Line
Stake
Stake
Stake
Stake
screeds
Building
screeds

Student: ______________ File Code: 70.01.01.24. A2-2

Date: ______________ Date Published: 7/1/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: SCREEDS FOR FLATWORK

1.. Concrete screeds are usually supported by:

   a. concrete.
   b. rocks.
   c. stakes.
   d. bricks.

2. Concrete screeds are used to perform which of the following functions?

   a. level concrete.
   b. plumb.
   c. place concrete vertically.
   d. place concrete perpendicular to a level plane.

3. If the tops of screeds are set to the top of concrete, which of the following must be done by the mason?

   a. re-establish the concrete grade.
   b. level slab to bottom instead.
   c. use a mechanical vibrator.
   d. remove screeds and fill void.

4. If reinforcement bars are used to join slabs, they must:

   a. protrude through the slab forms.
   b. be installed after concrete takes its set.
   c. be lagged bars.
   d. be smooth bars.

The following 6 questions refer to the illustration Common Types of Foundations.

5. In the illustration types of foundations, which letter corresponds to a monolithic foundation which requires the use of concrete screeds?

   a. 2
   b. 1
   c. 3
   d. 4

6. In the illustration types of foundations, which letter corresponds to a battered foundation which does not require the use of concrete screeds?

   a. 3
   b. 3'
   c. 4
   d. 2

7. In the illustration types of foundations, which letter corresponds to a bearing wall foundation which requires the use of concrete screeds?

   a. 5
   b. 4
   c. 3
   d. 6

8. In the illustration types of foundations, which letter corresponds to a flared foundation which does not require the use of concrete screeds?

   a. 1
   b. 5
   c. 6
   d. 4

9. In the illustration types of foundations, which letter corresponds to a pier foundation which does not require the use of concrete screeds?

   a. 1
   b. 6
   c. 5
   d. 2

10. In the illustration types of foundations, which letter would correspond to a pile cap foundation which requires the use of concrete screeds?

   a. 2
   b. 1
   c. 6
   d. 3

LAP TEST ANSWER KEY: **SCREEDS FOR FLATWORK**

1. C
2. A
3. D
4. A
5. B
6. D
7. C
8. D
9. C
10. C

File Code: 70.01.01.25.A1-0

Date Published: 8/20/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: __________

Date: __________

PERFORMANCE ACTIVITY: Tamping Concrete

OBJECTIVE:

List the advantages and disadvantages of tamping concrete.

EVALUATION PROCEDURE:

The description must be consistent with that stated in the resource material.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Marking and Edging" LAP test and is taken after completing that LAP.

RESOURCE:

Concrete Technology, Portland Cement Association.

PROCEDURE:

1. Read pages 78-86 in Concrete Technology.
2. List and describe the advantages and disadvantages of tamping concrete.
3. Go to the instructor for evaluation and checkoff.
4. Proceed to the next LAP.

Principal Author(s): R. Arneson

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.01.26.A2-0

Date Published: 8/20/75

Learning Activity Package

Student: __________

Date: __________

PERFORMANCE ACTIVITY: Marking and Edging

OBJECTIVE:

Describe marking and edging of flatwork.

EVALUATION PROCEDURE:

Description is consistent with resource material.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Concrete Technology, Portland Cement Association.

Edger.
Liner.
Tape measure (16 ft.).

PROCEDURE:

1. Review pages 77-81, 87 and 88 in Concrete Technology.
2. Write a description of marking and edging concrete flatwork.
3. Hand in the description for evaluation.
4. Take the LAP test.

Principal Author(s): R. Arneson

Student: ______________________ File Code: 70.01.01.25. A2-2
70.01.01.26. A2-2

Date: ______________________ Date Published: 7/1/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: TAMPING CONCRETE/MARKING AND EDGING

1. In the illustration of concrete tools, which figure would correspond to a tool that is used for hand floating plastic concrete?

   a. Fig 40
   b. Fig 44
   c. Fig 47
   d. Fig 45

2. In the illustration of concrete tools, which figure would correspond to tool that is used for power cutting of grooves in concrete for power?

   a. Fig 48
   b. Fig 43
   c. Fig 46
   d. Fig 42

3. In the illustration of concrete tools, which figure corresponds to a tool that is used for power floating?

   a. Fig 46
   b. Fig 48
   c. Fig 43
   d. Fig 45

4. In the illustration of concrete tools, which figure corresponds to a tool that is used for floating just prior to troweling?

   a. Fig 40
   b. Fig 43
   c. Fig 47
   d. Fig 44

5. In the illustration of concrete tools, which figure corresponds to a tool that is used for grooving plastic concrete?

    a. Fig 41
    b. Fig 42
    c. Fig 38
    d. Fig 37

6. In the illustration of concrete tools, which figure corresponds to a tool that that is used for rodding horizontally-placed (level) concrete?

    a. Fig 38
    b. Fig 37
    c. Fig 36
    d. Fig 44

7. A tamper is commonly called a:

    a. trowel.
    b. rod.
    c. float.
    d. jitterbug.

8. Which of the following is the recommended maxinum slump for concrete when using tampers?

    a. 3"
    b. 2"
    c. 1"
    d. 4"

9. A tool used to produce lines across a slab is a(an):

    a. trowel.
    b. groove.
    c. float.
    d. edger.

10. A groove is used to produce a (an) :

    a. expansion joint.
    b. control joint.
    c. expansive joint.
    d. compression joint.

70.01.01.25. A2-2
70.01.01.26. A2-2

LAP TEST ANSWER KEY: TAMPING CONCRETE/MARKING AND EDGING

[illegible]

1. D
2. B
3. A
4. D
5. B
6. C
7. D
8. C
9. B
10. B

File Code: 70.01.01.27.A2-0

Date Published: 8/20/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Expansion Materials in Concrete Work

OBJECTIVE:

Describe the function of isolation, control, construction and combination joint.

EVALUATION PROCEDURE:

The description and sketches must be consistent with the references.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Concrete Technology, Portland Cement Association.
Carpentry, Carpenters Printing Plant.

PROCEDURE:

1. Read pages 96-99 in Concrete Technology and pages 18-19, Unit X in Carpentry.
2. Make a sketch of and describe each type of joint.
3. Have the description and sketches evaluated.
4. Take the LAP test.

Principal Author(s): R. Arneson

Student: ______________________ **File Code:** 70.01.01.27. A2-2

Date: ______________________ **Date Published:** 7/1/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: EXPANSION MATERIALS IN CONCRETE WORK

1. A construction joint is commonly called a(an):

   a. dumpy joint.
   b. expansion joint.
   c. expansive joint.
   d. control joint.

2. A slang for a construction joint is:

   a. expansive joint.
   b. expansion joint.
   c. dumpy joint.
   d. control joint.

3. What type of joint is used when a slab abuts a rigid object?

   a. construction joint.
   b. control joint.
   c. dumpy joint.
   d. expansion joint.

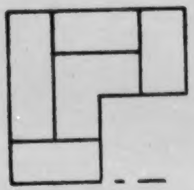
4. A water tight joint uses:

   a. metal round sheet.
   b. metal corrogate iron.
   c. metal flat sheet.
   d. a wood wedge.

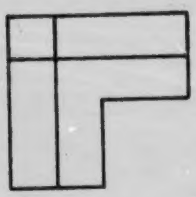
5. Control joints in slabs must be placed a maximum of:

   a. 15'
   b. 10'
   c. 12'
   d. 10'

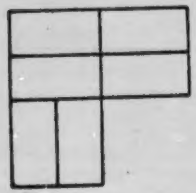
6. Which of the following would be the right place to lay out concrete joints?



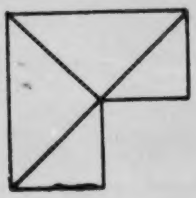
1



2



3



4

7. When a saw cut is placed in a wood key way, this is properly called:

- a. kerfing.
- b. cutting.
- c. notching.
- d. grooving.

8. In the typical sidewalk illustration, which number corresponds to the side forms?

   a. 4
   b. 2
   c. 3
   d. 1

9. In the typical sidewalk illustration, which number corresponds to the strike board?

   a. 4
   b. 1
   c. 2
   d. 3

10. In the typical sidewalk illustration, which number corresponds to the control joint board?

    a. 1
    b. 2
    c. 3
    d. 4

LAP TEST ANSWER KEY: EXPANSION MATERIALS IN CONCRETE WORK

1. D
2. C
3. D
4. D
5. D
6. D
7. A
8. D
9. D
10. B

File Code: 70.01.01.28.A2-0

Date Published: 3/20/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Rebar Identification

OBJECTIVE:

Identify reinforcement bars (Rebar) by number and diameter.

EVALUATION PROCEDURE:

Accurate identification by number and diameter.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Ordering Reinforcing Steel" LAP test and is taken after completing that LAP.

RESOURCE:

Concrete Technology, Portland Cement Association.

PROCEDURE:

1. Read pages 105-111 in Concrete Technology.
2. Obtain samples of rebar.
3. Make a list of the rebar samples by number and diameter.
4. Have the identification evaluated.
5. Proceed to the next LAP.

Principal Author(s): R. Arneson

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.01.29.A2-0

Date Published: 8/20/75

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Ordering Reinforcing Steel

OBJECTIVE:

Given specifications, order the steel required by quantity, number and diameter.

EVALUATION PROCEDURE:

Accurate ordering by quantity, number and diameter.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCE:

Concrete Technology, Portland Cement Association.

PROCEDURE:

1. Review pages 105-111 in Concrete Technology.
2. Obtain specifications.

   Note: Most prints do not show rebar details; therefore, you should consider a typical steel installation for the specifications provided by the instructor.
3. Prepare a list of required steel by quantity, number and diameter.
4. Have the list evaluated.
5. Take the LAP test.

Principal Author(s): R. Arneson

Student: ______________________ File Code: 70.01.01.28. A2-2
70.01.01.29. A2-2

Date: ______________________ Date Published: 7/1/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: REBAR IDENTIFICATION/ORDERING REINFORCING STEEL

1. Another term referring to the concrete-pulling-apart strength is:

   a. compressive strength.
   b. load strength.
   c. tensile strength.
   d. variance strength.

2. Another term referring to the concrete-crushing strength is:

   a. variance strength.
   b. tensile strength.
   c. load strength.
   d. compressive strength.

3. Tensile strength refers to:

   a. crushing.
   b. bending.
   c. load.
   d. variance.

4. Which of the following concrete strengths has the ability to stop from being pulled apart?

   a. compressive.
   b. tensile.
   c. load.
   d. variance.

5. The most common reinforcement **material** used in concrete is made of:

   a. steel.
   b. copper.
   c. aluminum.
   d. brass.

6. Most reinforcement bars come in what lengths?

   a. 20'
   b. 16'
   c. 10'
   d. 15'

7. Larger diameter reinforcement bars have which of the following characteristics?

   a. semi smooth.
   b. smooth.
   c. oblique surfaces.
   d. lags.

8. Where is the reinforcement steel placed in a beam?

   a. near the lower side.
   b. near the upper side.
   c. near the middle.
   d. on the upper portion just past the middle.

9. How is steel usually placed on round structures?

   a. near the middle towards the outside.
   b. near the middle towards the inside.
   c. near the middle.
   d. near the inside edge.

10. What is the minimum recommended amount of concrete coverage of steel in slabs?

   a. 1"
   b. 3/4"
   c. 1 1/2"
   d. 2"

LAP TEST ANSWER KEY: REBAR IDENTIFICATION/ORDERING REINFORCING STEEL

1. C
2. D
3. B
4. B
5. A
6. A
7. D
8. A
9. A
10. B

UNIT POST TEST ANSWER KEY: EXCAVATION LAYOUT - CONCRETE AND FORMS

LAP		
01	1.	C
	2.	D
	3.	D
	4.	B
	5.	C
02	6.	D
	7.	A
	8.	D
	9.	C
	10.	C
03	11.	A
	12.	B
	13.	D
	14.	C
	15.	B
04	16.	B
	17.	D
	18.	B
	19.	D
	20.	B
05	21.	A
	22.	C
	23.	A
	24.	A
	25.	D
06	26.	B
	27.	D
	28.	D
	29.	D
	30.	B
07	31.	C
	32.	B
	33.	D
	34.	B
	35.	A
08	36.	B
	37.	C
	38.	B
	39.	C
	40.	B
09	41.	D
	42.	A
	43.	B
	44.	B
	45.	A
10	46.	D
	47.	C
	48.	C
	49.	D
	50.	D
11	51.	D
	52.	A
	53.	B
	54.	C
	55.	B
12	56.	B
	57.	D
	58.	D
	59.	D
	60.	A
13	61.	A
	62.	C
	63.	B
	64.	B
	65.	B
14	66.	C
	67.	C
	68.	G
	69.	B
	70.	D
15	71.	D
	72.	A
	73.	D
	74.	A
	75.	D
16	76.	A
	77.	B
	78.	C
	79.	C
	80.	C
17	81.	B
	82.	B
	83.	D
	84.	B
	85.	B
18	86.	C
	87.	C
	88.	B
	89.	A
	90.	A

UNIT POST TEST ANSWER KEY: EXCAVATION LAYOUT - CONCRETE AND FORMS

LAP		
19	91.	A
	92.	C
	93.	B
	94.	D
	95.	C
21	96.	C
	97.	D
	98.	C
	99.	A
	100.	B
22	101.	C
	102.	C
	103.	C
	104.	C
	105.	C
23	106.	C
	107.	C
	108.	C
	109.	A
	110.	A
24	111.	C
	112.	A
	113.	D
	114.	C
	115.	C
25-26	116.	D
	117.	D
	118.	D
	119.	C
	120.	B
27	121.	A
	122.	A
	123.	C
	124.	B
	125.	B
28-29	126.	D
	127.	C
	128.	A
	129.	B
	130.	C

File Code: 70.01.02.00.A2-1

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Experience Guide

UNIT: FLOOR AND WALL FRAMING

RATIONALE:

Framing of the floors and walls for a structure is performed by carpenters. The floor and wall framing tasks are among the first done for the structure. It is important that these framing tasks be done well since the results become the support for floor and roof components. Knowing what materials to use and how to assemble and install them are requirements for a qualified carpenter. Developing skill to perform a quality framing job is also necessary. The activities in this unit are planned to assist in achieving necessary floor and wall framing skills.

PREREQUISITES:

Prerequisites for this unit are the same as for the course and are listed in the course guide.

OBJECTIVES:

Given specifications, tools, equipment and materials you will:

Identify parts for components included in framing wall and floor construction.

Determine the material requirements for floor and wall framing.

Assemble and lay out the materials for floor and wall framing jobs.

Assemble and install framing for floors and walls.

RESOURCES:

Printed Materials

Blueprint Reading and Sketching, Carpentry Trades, Residential. Delmar Publishers, 1957.
Carpentry. United Brotherhood of Carpenters and Joiners of America, Carpenters Printing Plant, Washington, D.C., 1950-1970.
Collectionsof blueprints
Collection of specification sheets
Modern Carpentry. Willis H. Wagner, Goodheart-Willcox Company, Inc., 1973.

Principal Author(s): Lyle Leland

Equipment

Bar, flat rip.
Bits, auger set.
Bits, twist set.
Box, chalk.
Brace, hand.
Drill, electric hand.
Hammer, claw (16 oz. and 20 oz.).
Level, spirit.
Line, chalk.
Saw, power hand (6½" blade).
Saw, radial arm.
Saw table.
Square, combination.
Square, framing.
Tape measure (12 ft., 16 ft., 25 ft., 50 ft. and 100 ft.).
Wrench, adjustable.

GENERAL INSTRUCTIONS:

This unit consists of 24 Learning Activity Packages (LAPs). Each LAP will provide specific information for completion of a learning activity.

The general procedure for this unit is as follows:

(1) Read the first assigned Learning Activity Package (LAP).
(2) Begin and complete the first assigned LAP.
(3) Take and score the LAP test.
(4) Turn in the LAP test answer sheet.
(5) Determine the reason for any missed items on the LAP test.
(6) Proceed to and complete the next assigned LAP in the unit.
(7) Complete all required LAPs for the unit by following steps 3 through 6.
x(8) In this Unit, there are some LAPs that have tests combined with other LAP tests. These combined tests are taken after completing the last LAP covered by the test.
(9) Take the unit tests as described in the Unit LEG "EValuation Procedures."
(10) Proceed to the next assigned unit.

You will work independently unless directed to do otherwise. When questions or problems arise, you are expected to discuss them with the instructor. At all times remember to follow correct safety procedures during the performance activity.

PERFORMANCE ACTIVITIES:

.01
.01 Floor Sections
.02 Mud Sill
.03 Box Sill and Rim Joist

.04 Types of Girders
.05 Location and Spacing of Girder Posts
.06 Floor Joist
.07 Solid Bridging
.08 Herringbone Bridging
.09 Stairwell
.10 Floor Frame Straightening and Bracing
.11 Subfloor
.12 Materials for a Floor
.13 Wall Section
.14 Size of Headers
.15 Height of Headers
.16 Length and Spacing of Studs
.17 Location of All Plates
.18 Plate Installation
.19 Stud Installation
.20 Squaring a Wall Section
.21 Plumbing a Wall Section
.22 Wall Sheathing
.23 Materials for Wall Sections
.24 Rough Opening Sketching

EVALUATION PROCEDURE:

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.
3. The student then takes a unit performance test if the unit pretest was successfully completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes a multiple-choice unit post test and a unit performance test.
2. Successful unit completion is meeting the listed criteria for the performance test.

Student: ______________________ File Code: 70.01.02.00.A2-2

Date: ______________________ Date Published: 7/3/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

UNIT PRETEST: FLOOR AND WALL FRAMING

70.01.02.01

1. The floor member that carries the weight from the mud sill to the support girder in a house is called a:

   a. tail joist.
   b. header joist.
   c. floor joist.
   d. girder joist.

2. The joist member that runs along the sides of a house and blocks off the other joist to form a box is called a:

   a. balloon joist.
   b. tail joist.
   c. cripple joist.
   d. header joist.

3. When spacing floor joists 16" O.C., what is the first measurement used from the outside edge of the header to the first joist if the joists are considered to be 1½" thick?

   a. 14½".
   b. 16".
   c. 15¼".
   d. 15 3/4".

4. Joist hangers are used for what purpose?

   a. to hang both beam and joist.
   b. to hang a beam on joist.
   c. to hang joist on a beam.
   d. they have no purpose on floor framing.

5. Which type of framing would probably be used on a two story house?

   a. balloon.
   b. western.
   c. rigid.
   d. hip.

70.01.02.02

6. What is the minimum distance mud sills should be located from the finished grade?

   a. 20".
   b. 12".
   c. 16".
   d. 8".

70.01.02.02 cont.

7. What is the recommended maximum distance between anchor bolts on concrete foundations?

   a. 6'
   b. 8'
   c. 4'
   d. 10'

8. Anchor bolts should be positioned at the corners to require how many fastening positions?

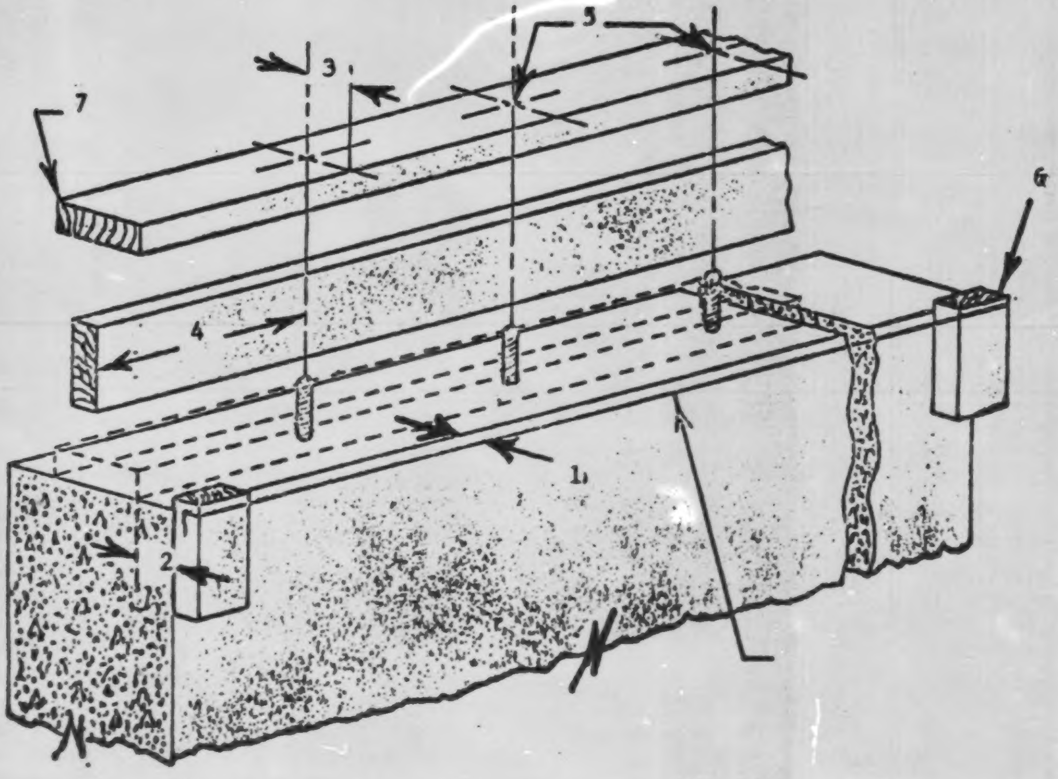
   a. one.
   b. two.
   c. three.
   d. four.

9. **Which number would indicate the center of the bolt and therefore, the center of the drill hole through the sill plate?**

   a.
   b.
   c.
   d.

10. **Which number indicates the lining block?**

   a.
   b.
   c.
   d.

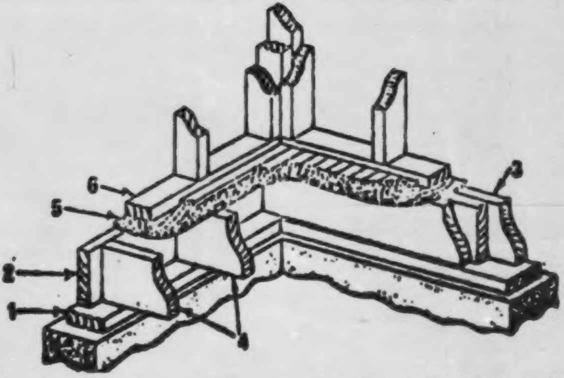


ALIGNING AND DRILLING SILL PLATES

70.01.02.03

11. In the box sill illustration which number would correspond to the end joist or rim joist?

    a. 2
    b. 3
    c. 4
    d. 1



12. If a partition for a bathroom is running parallel with the floor joist, the floor joist should be:

    a. omitted.
    b. spaced the width of plumbing pipes.
    c. nailed solidly together under the wall.
    d. double the next 16" joist.

13. What is the spacing of the floor joists in the bedrooms? (See plan.)

    a. 16" O.C.
    b. 24" O.C.
    c. 15¼" O.C.
    d. 14½" O.C.

14. How long would the joists have to be in the bedrooms? (See plan.)

    a. 16'
    b. 12'
    c. 14'
    d. 10'

15. What size are the floor joists in the living room? (see plans.)

    a. 2 x 12.
    b. 2 x 8.
    c. 2 x 10.
    d. 2 x 6.

70.01.02.04 and 70.01.02.05

16. What supports the beam in the garage area? (See plan.)

    a. wood post.
    b. iron post.
    c. lally column.
    d. adjustable steel post.

70.01.02.04 and 70.01.02.05 cont.

17. How many pieces of material would have to be ordered for the girder that supports the living room floor? (See plan.)

a. 4
b. 2
c. 3
d. 8

18. What supports the girder in the living room at the corner of the porch? (See plan.)

a. foundation.
b. pipe column.
c. beam pocket.
d. wood post.

19. What size is the member that supports the girder in the living room area at the corner of the porch? (See plan.)

a. 4"
b. 3"
c. 8"
d. 10"

20. When figuring girder load, which of the following does it include?

a. center to center of span.
b. span from outside wall to outside wall.
c. span from outside wall to girder.
d. runs from outside wall to girder.

70.01.02.06

21. In the illustration figure 11A, which number would correspond to the solid bridging?

a. 7
b. 8
c. 4
d. 5

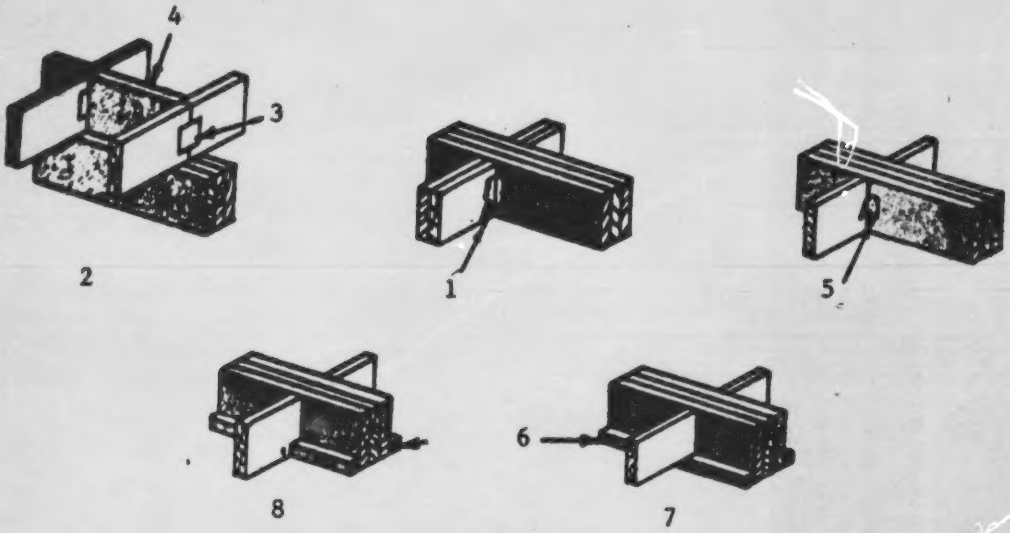
22. In the illustration figure 11A, which number would correspond to a framing anchor?

a. 1
b. 5
c. 8
d. 4

23. In the illustration figure 11A, which number would correspond to the ledger board?

a. 5
b. 8
c. 7
d. 6

70.01.02.06 cont.

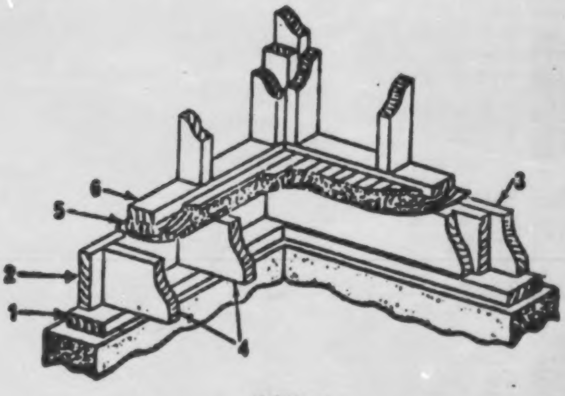


PLACING IN LINED JOISTS

Fig. 11A

24. In the box sill illustration which number would correspond to the rim joist?

a. 3
b. 2
c. 4
d. 1



BOX SILL

25. In the box sill illustration which number would correspond to the sole plate?

a. 2
b. 5
c. 3
d. 6

70.01.02.07 and 70.01.02.08

26. A tack nail stay is used when the purpose of installing cross bridging is to:

a. toenail ends of bridging.
b. nail cross bridging in place.
c. hold joist on center.
d. maintain firmness of floor.

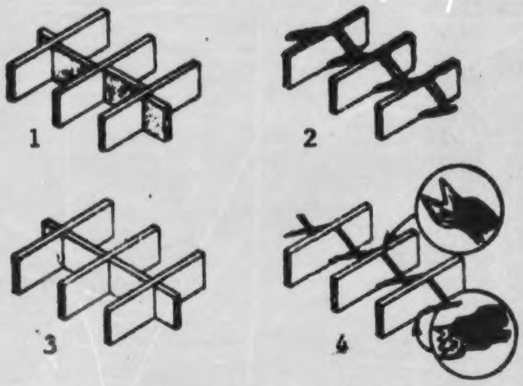
70.01.02.07 and 70.01.02.08 cont.

27. What size nails are recommended to install wood cross bridging?

    a. 10d
    b. 6d
    c. 8d
    d. 12d

28. In the illustration of types of bridging, which letter would correspond to metal cross bridging?

    a. 1
    b. 3
    c. 2
    d. 4



TYPES OF BRIDGING

Fig. 20

29. When are the bottom ends of cross bridging nailed?

    a. second procedure.
    b. first procedure.
    c. after sub floor is on.
    d. before tail joists are installed.

30. Metal bridging used for 2 x 12 joists spaced at 16" O.C.:

    a. cannot be applied to 2 x 10 joists.
    b. can also be used for 2 x 12 joists 24" O.C.
    c. is nailed at both ends at the same time.
    d. can be cut short to fill odd spaces.

70.01.02.09

31. In the illustration figure 23 the member(s) labelled number 1 is (are) called which of the following?

    a. rim joist.
    b. tail joist.
    c. floor joist.
    d. headers.

32. In the illustration the member(s) labelled number 3 is (are) called which of the following?

    a. rim joist.
    b. headers.
    c. tail joists.
    d. floor joist (trimmer)

70.01.02.09 cont.

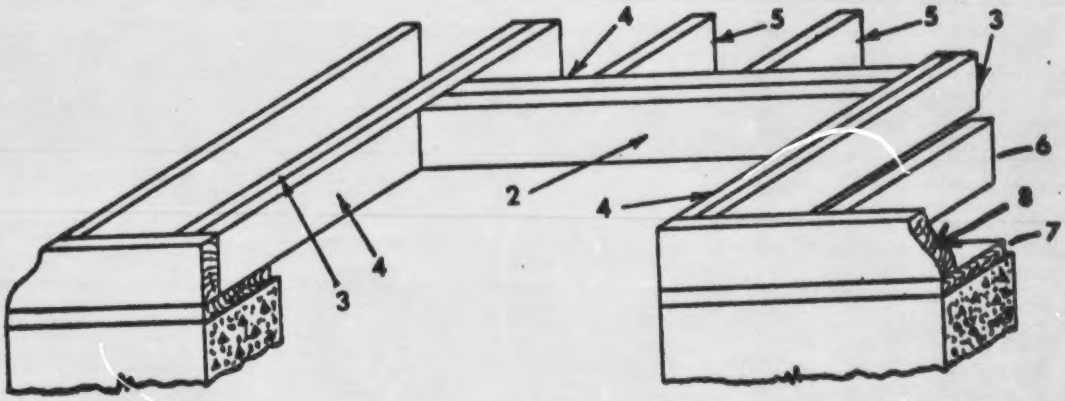


Fig. 23

33. In the illustration the member(s) labelled number 6 is (are) called which of the following?

    a. tail joist.
    b. headers.
    c. box sill.
    d. floor joist.

34. In figure 23 of a stairwell opening, which number would correspond to the third member(s) to be installed when making a stairwell?

    a. 4
    b. 5
    c. 1
    d. 2

35. In figure 23 of a stairwell opening, which number would correspond to the fifth member(s) that would be installed by the craftsman when making 2 stairwell?

    a. 3
    b. 4
    c. 1
    d. 2

70.01.02.10 and 70.01.02.11

36. After the box sill and rim joists have been straightened, they must be toe-nailed to:

    a. the foundation.
    b. the sill plate.
    c. the floor joist.
    d. the trimmers.

70.01.02.10 and 70.01.02.11 cont.

37. When laying subfloor boards, you should be sure to break the joists a minimum of how many joists?

a. 1
b. 2
c. 3
4. 4

38. Where should T & G subfloor be nailed?

a. in the grove.
b. on the side surface.
c. on the top surface.
d. on the tongue.

39. If subfloor is run square square across the floor joist, which way must the finish floor run?

a. across the floor joist.
b. with the floor joist.
d. along the floor joist.
d. T & G with the floor joist.

40. In the illustration figure 38, which number would correspond to the subfloor.

a. 6
b. 1
c. 5
d. 7

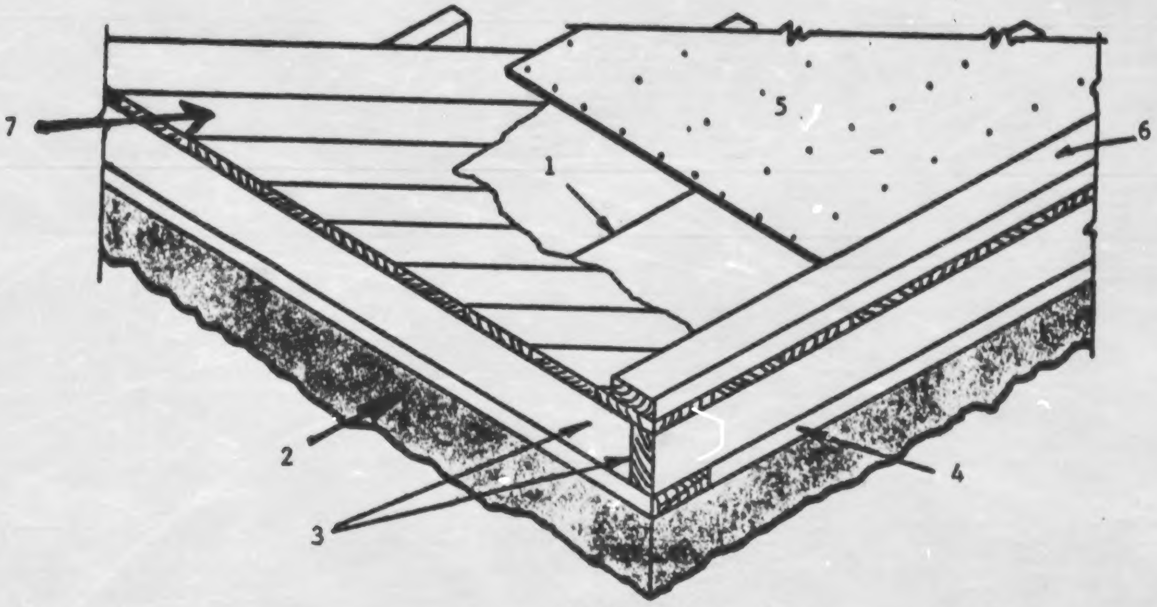


Fig. 38

70.01.02.12

41. What size is the sill plate in the house area only? (See plan.)

    a. 2 x 8.
    b. 2 x 6.
    c. 2 x 4.
    d. 4 x 6.

42. What size is the sill plate in the garage? (See plan.)

    a. 2 x 4.
    b. 2 x 6.
    c. 4 x 6.
    d. 2 x 8.

43. Approximately how many floor joists would be needed to carry the floor over the bedrooms and bath area? (See plan.)

    a. 27.
    b. 24.
    c. 33.
    d. 18.

44. How many floor joists are required every four feet in this house? (See plan.)

    a. 5
    b. 2
    c. 4
    d. 3

45. What is the spacing of the floor joists in this home? (See plan.)

    a. 16" O.C.
    b. 20" O.C.
    c. 24" O.C.
    d. 36" O.C.

70.01.02.13

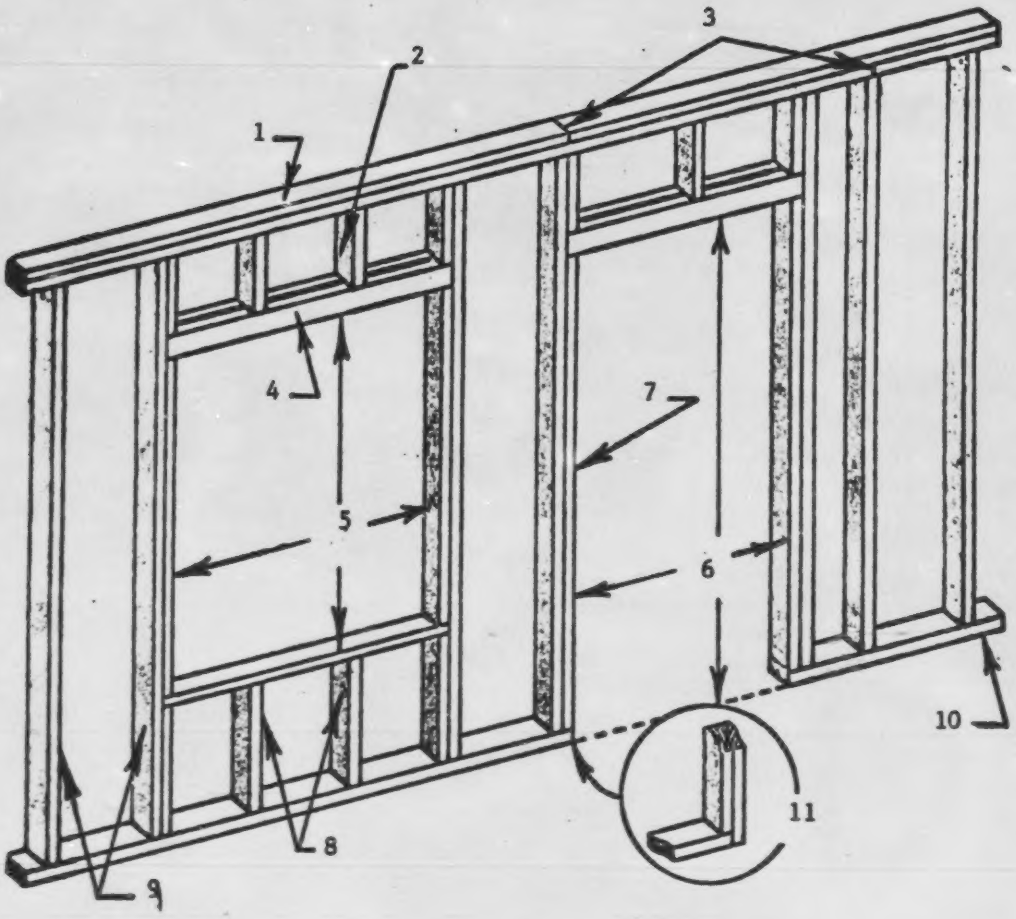
46. In figure 54, which number would correspond to the alternate door stud arrangement?

    a. 4
    b. 3
    c. 9
    d. 11

47. In figure 54, which number would correspond to the window rough opening?

    a. 6
    b. 5
    c. 3
    d. 4

70.01.02.13 cont.



A TYPICAL WALL FRAME

Fig. 54

48. In figure 54, which member would correspond to the studs?

a. 8
b. 7
c. 4
d. 9

49. The member that runs from the sole plate to the bottom double plate on a wall section is called a:

a. double header.
b. cripple stud.
c. stud.
d. trimmer stud.

70.01.02.13 cont.

50. The member that spans a rough opening is called a:

    a. double header.
    b. cripple stud.
    c. trimmer stud.
    d. stud.

70.01.02.14

HEADER SPANS

Material on Edge	Supporting one floor, ceiling, roof	Supporting only ceiling and roof
2 x 4	3' - 0"	3' - 6"
2 x 6	5' - 0"	6' - 0"
2 x 8	7' - 0"	8' - 0"
2 x 10	8' - 0"	10' - 0"
2 x 12	9' - 0"	12' - 0"

51. Using the table on header spans, what size header would be required for openings labeled letter F in the house? (See plan.)

    a. 2 x 4.
    b. 2 x 6.
    c. 2 x 8.
    d. 2 x 10.

52. Using the table above, what size header would be required for windows numbered 7 in the house plan? (See plan.)

    a. 2 x 10.
    b. 2 x 12.
    c. 2 x 8.
    d. 2 x 6.

53. Using the table on header spans, what size header would be required for openings labeled number 12 in the house? (See plan.)

    a. 2 x 10.
    b. 2 x 6.
    c. 2 x 8.
    d. 2 x 4.

54. Using the table on header spans, what size headers would be used for the rough openings in the back bedroom SW elevation?

    a. 2 x 10.
    b. 2 x 4.
    c. 2 x 8.
    d. 2 x 6.

70.01.02.14 cont.

55. Using the table on header spans, what size headers would be used for the rough openings in the front bedroom NE elevation? (See plan.)

a. 2 x 6.
b. 2 x 10.
c. 2 x 12.
d. 2 x 8.

70.01.02.15

56. What is the height to the headers measured from the top of the sole plate in the wall section of the house? (See plan.)

a. 6'8"
b. 6'9"
c. 6'10½"
d. 6'8½"

57. What is the length of the trimmers to be used with the headers for support in the wall section of the house? (See plan.)

a. 6'8"
b. 6'9"
c. 6'10½"
d. 6'8½"

58. Allowing 1" to square the window in the rough opening, what length are the headers in the bedrooms (see plan) SW elevation?

a. 5'4"
b. 2'6"
c. 2'7"
d. 2'9½"

59. Allowing 1" to square the window in the rough opening, what length are the headers in front of the kitchen sink (see plan) NE elevation?

a. 3' 2 3/4"
b. 3' 1 3/4"
c. 3' 5 3/4"
d. 3' 4 1/4"

60. Allowing 1" to square the window in the rough opening, what length are the headers in the living room of the house (see plan) SW elevation?

a. 10'9"
b. 11'
c. 10'10"
d. 11'1"

70.01.02.17

61. What is the width of the passageway between the bedrooms center to center? (See plan.)

    a. 8'0"
    b. 3'7⅛"
    c. 3'5½"
    d. 3'9"

62. What is the width of the passageway between the bedroom inside the two walls considering only the wood? (See plan.)

    a. 8'0"
    b. 3'9"
    c. 3'7⅛"
    d. 3'5½"

63. How wide is the living room inside the wood framing? (See plan.)

    a. 14'10½
    b. 14'7"
    c. 14'9"
    d. 14'8"

64. How long is the living room from inside the outside wall to the inside partition? (See plan.)

    a. 23'4½"
    b. 23'3"
    c. 22'11½"
    d. 25'7"

65. How wide is the porch outside to outside?

    a. 7'8½"
    b. 7'11½"
    c. 7'9"
    d. 7'

70.01.02.18

66. The raising of interior partitions in Western Framing Construction usually begins with:

    a. the longest partition that runs parallel to the long dimension of the building.
    b. reading the planned sequence noted on the framing details of the building plan.
    c. the longest partition that runs parallel to the short dimension of the building.
    d. the shortest partition that runs parallel to the long dimension of the building.

70.01.02.18 cont.

67. A properly placed diagonal let-in brace is:

- a. let-in to the top plate and bottom plate.
- b. butted and blocked to the top plate.
- c. butted and blocked to the sole plate.
- d. let-in to the top plate and blocked to the sole plate.

68. The purpose of the doubled plate in Western Frame Construction is:

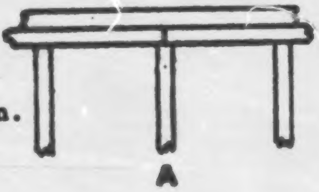
- a. to add strength to the top of the wall.
- b. to tie (by lapping) intersecting walls.
- c. strengthen the upper plate joints.
- d. all of the above.

69. Fire blocking that is installed with one end below and one end above the center line in a wall section is called:

- a. inline.
- b. herringbone.
- c. staggered.
- d. straight.

70. In figure 64 illustration, A depicts which of the following:

- a. trimmer.
- b. splice.
- c. corner.
- d. partition.



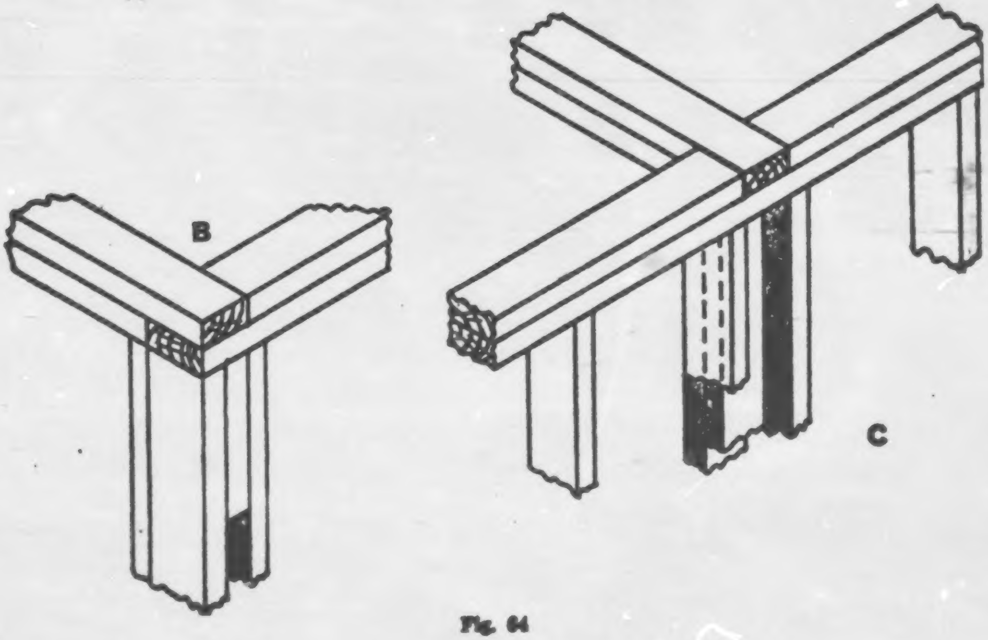


Fig. 64

70.01.02.16 and 70.01.02.19

71. Which of the following is a common symbol for a stud when installing studs?

- a. XT
- b. S
- c. T
- d. X

72. When applying wall sheathing on a wall section prior to tipping it up, which of the following must be true to determine if the wall section is square?

- a. walls must be vertical.
- b. diagonals must be unequal.
- c. walls must be plumb.
- d. diagonals must be equal.

73. A member that runs from plate to plate in a wall section is called a:

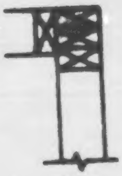
- a. stud.
- b. rafter.
- c. cripple.
- d. trimmer.

74. A member that runs on a horizontal plane and spans an openings in a wall section is called a:

- a. cripple.
- b. trimmer.
- c. header.
- d. stud.

75. A member that has a configuaration like this figure A is a:

- a. trimmer stud.
- b. partition stud.
- c. cripple stud.
- d. corner stud.



A

70.01.02.20 70.01.02.21 70.01.02.22

76. When using a plumb bob to level a wall section which of the following tools must be used?

- a. combination square.
- b. level.
- c. square.
- d. spacer block.

77. In modern platform construction, the horizontal member located at the bottom of a wall section is called a:

- a. box sill.
- b. sill plate.
- c. sole plate.
- d. ribband.

70.01.02.20 70.01.02.21 70.01.02.22 cont.

78. How many studs would be in a section of wall 8'0" long?

    a. 7
    b. 8
    c. 6
    d. 5

79. Standard wall bracing is commonly made from:

    a. 1 x 10.
    b. 1 x 4.
    c. 2 x 4.
    d. 2 x 6.

80. What are the two standard thicknesses of regular fiberboard sheathing?

    a. 1" and 1/2"
    b. 5/8" and 3/4"
    c. 3/4" and 1/2"
    d. 1 1/4" and 3/4"

70.01.02.

81. Approximately how many studs will be required on the SE wall which includes the two bedrooms and the bath? (See plan.)

    a. 35
    b. 22
    c. 13
    d. 31

82. How many typical outside wood corner stud assemblies are there in the SE wall of the house? (See plan.)

    a. 1
    b. 0
    c. 2
    d. 3

83. If the headers in the SE wall are to be constructed of 2 x 6, what length of 2 x 6 will be required for each bedroom window rough opening?

    a. 3'
    b. 10'
    c. 12'
    d. 5'

84. How many L/F (linear feet) will be needed for the top plates on the SE wall section of the house? (See plan.)

    a. 70'
    b. 35'
    c. 105'
    d. 140'

70.01.02.23

85. How many typical wood corner assemblies will be required for the front wall of the bedroom? (See NE elevation and floor plan.)

    a. one.
    b. two.
    c. three.
    d. four.

UNIT PRETEST ANSWER KEY: FLOOR AND WALL FRAMING

70.01.02.01

1. C
2. D
3. C
4. C
5. A

70.01.02.02

6. D
7. B
8. B
9. C
10. A

70.01.02.03

11. B
12. B
13. A
14. C
15. C

70.01.02.04
&
70.01.02.05

16. C
17. A
18. B
19. B
20. A

70.01.02.06

21. C
22. B
23. D
24. A
25. D

70.01.02.07
&
70.01.02.08

26. C
27. C
28. D
29. C
30. A

70.01.02.09

31. D
32. D
33. D
34. B
35. A

70.01.02.10
&
70.01.02.11

36. B
37. B
38. C
39. B
40. D

70.01.02.12

41. D
42. A
43. C
44. D
45. A

70.01.02.13

46. D
47. B
48. D
49. C
50. A

70.01.02.14

51. A
52. B
53. D
54. D
55. D

70.01.02.15

56. B
57. B
58. A
59. C
60. D

70.01.02.17

61. D
62. D
63. B
64. C
65. B

70.01.02.18

66. A
67. A
68. D
69. B
70. B

70.01.02.16
&
70.01.02.19

71. D
72. D
73. A
74. C
75. D

70.01.02.20
70.01.02.21
70.01.02.22

76. D
77. C
78. A
79. B
80. C

70.01.02.23

81. B
82. B
83. C
84. A
85. A

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.02.01.A2-0

Date Published: 8-18-75

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Floor Sections

OBJECTIVES:

Sketch and identify all the different parts of a typical floor section.

EVALUATION PROCEDURE:

100% accurate identification of the parts in a typical floor section.

Answer correctly at least 80% of the multiple-choice test items.

RESOURCES:

Modern Carpentry, Wagner.
Carpentry, Carpenters Printing Plant.

PROCEDURE:

1. Read pages 111-134 in Modern Carpentry.
2. Read pages 1-30, Unit III in Carpentry.
3. Obtain the necessary supplies.
4. Sketch a typical floor section.
5. Label the parts of the floor section.
6. Obtain evaluation for the sketch.
7. Take the LAP test.

Principal Author(s):

Student: ______________________ File Code: 70.01.02.01.A2-2

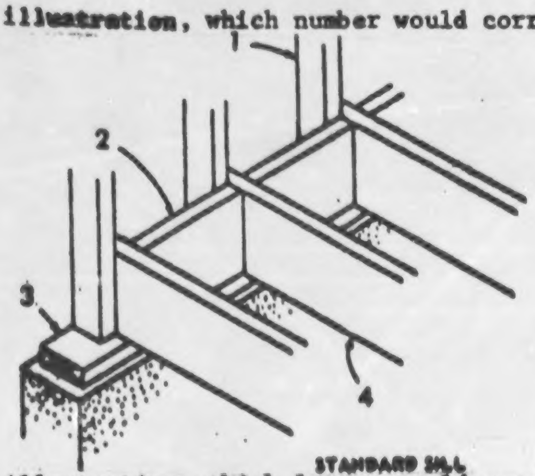
Date: ______________________ Date Published: 7/5/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: FLOOR SECTIONS

1. On the standard sill illustration, which number would correspond to the fire strippers?

   a. 4
   b. 1
   c. 3
   d. 2



STANDARD SILL

2. On the standard sill illustration, which letter would correspond to the mud sill?

   a. 4
   b. 1
   c. 3
   d. 2

3. On the standard sill illustration, which letter would correspond to the stud?

   a. 1
   b. 3
   c. 2
   d. 4

4. What is the name of the joist that is used to span an opening, for example, the end of a stairwell?

   a. balloon joist.
   b. tail joist.
   c. floor joist.
   d. header joist.

5. The member that lies flat on the foundation is called a(n):

   a. box sill.
   b. mud sill.
   c. header.
   d. apron.

6. The joist that runs into the member at the end of a stairwell is called a:

   a. balloon joist.
   b. tail joist.
   c. header joist.
   d. cripple joist.

7. Joist hangers are used for what purpose?

   a. to hang both beam and joist.
   b. to hang a beam on joist.
   c. to hang joist on a beam.
   d. they have no purpose on floor framing.

8. The pieces that are used to support floor joists when a flush beam is used are called:

   a. wiggle nails.
   b. joist hangers.
   c. bolts.
   d. beam pockets.

9. What are the two basic types of framing?

   a. rigid and balloon.
   b. balloon and western.
   c. valley and western.
   d. hip and western.

10. Which type of framing would probably be used on a two story house?

   a. balloon.
   b. western.
   c. rigid.
   d. hip.

LAP TEST ANSWER KEY: FLOOR SECTIONS

1. d
2. c
3. c
4. d
5. b
6. d
7. c
8. b
9. b
10. a

File Code: 70.01.02.02.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Mud Sill

OBJECTIVES:

Identify, prepaee and install a mud sill.

EVALUATION PROCEDURE:

Installation meets the criteria on the attached checklist.

Correctly answer at least 80% of the multiple-choice test items.

RESOURCES:

Modern Carpentry, Wagner.
Carpentry, Carpenters Printing Plant.

Adjustable wrench
Brace and bits
Claw hammer
Combination square
Power hand drill and bits
Power hand saw (6½")
Tape measure (12 ft.)

PROCEDURE:

1. Read pages 120-121 in Modern Carpentry and pages 1-30, Unit III in Carpentry.
2. Obtain specifications.
3. Obtain the necessary tools and equipment.
4. Complete the mud sill installation.
5. When the job is completed, have it evaluated.
6. If satisfactory, put the tools and supplies away.
7. Take the LAP test.

Principal Author(s):

CHECKLIST: MUD SILL INSTALLATION

_____ Measurements are accurate to ± 1/8".

_____ Sills are positioned properly and drilled correctly.

_____ Assembly procedures are consistent with those established in the trade.

Student: ______________________ File Code: 70.01.02.02.A2-2

Date: ______________________ Date Published: 7/5/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: MUD SILL

1. Mud sills are fastened to foundations with:

    a. nails.
    b. anchor bolts.
    c. grout.
    d. screws.

2. How are mud sills laid on foundations?

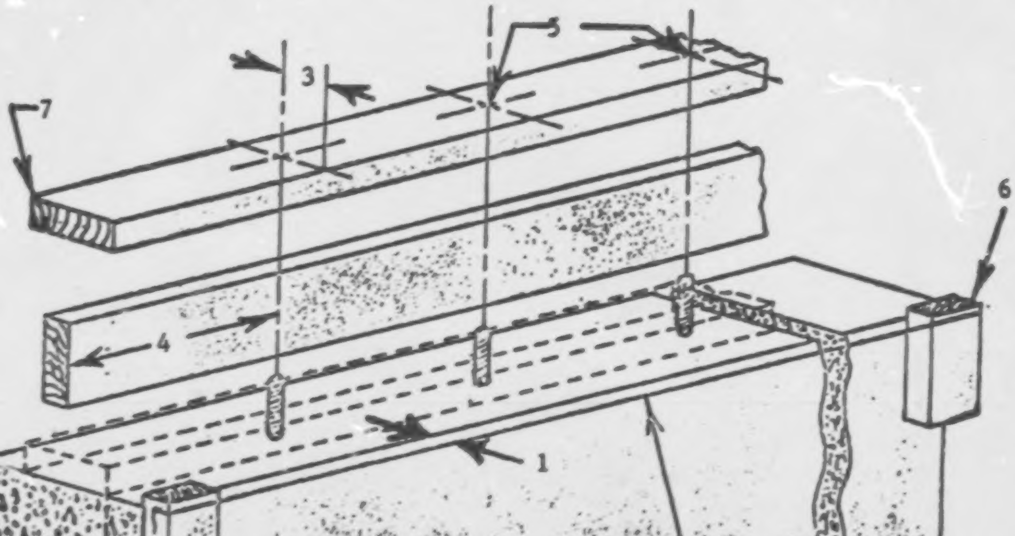
    a. flat.
    b. on edge.
    c. vertically.
    d. diagonally.

3. If termites are present in a locality, what should be used?

    a. bronze or brass bolts.
    b. bolts (galvanized).
    c. screws (galvanized).
    d. shield.

4. Anchor bolts should be positioned at the corners to require how many fastening positions?

    a. one.
    b. two.
    c. three.
    d. four.



ALIGNING AND DRILLING SILL PLATES

5. Which point would be the building line?

   a. 1
   b. 3
   c. 2
   d. 5

6. Which number would indicate the center of the bolt and therefore, the center of the drill hole through the sill plate?

   a. 4
   b. 3
   c. 5
   d. 2

7. Which number indicates the lining block?

   a. 6
   b. 7
   c. 4
   d. 2

8. Which number would correspond to using the line and block method of alighment of sill plates?

   a. 2
   b. 1
   c. 3
   d. 4

9. The first step necessary, when marking bolt center, requires the plate to be:

   a. flat.
   b. inclined.
   c. on edge.
   d. level.

10. Which number would identify the distance from the center of the bolt to the building line?

   a. 3
   b. 4
   c. 2
   d. 1

LAP TEST ANSWER KEY: MUD SILL

1. b
2. a
3. d
4. b
5. c
6. c
7. a
8. b
9. c
10. a

File Code: 70.01.02.03.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Box Sill and Rim Joist

OBJECTIVES:

Using recommended practices and procedures, lay out and install a box sill and rim joist according to given specifications.

Identify procedures for lay out and installation of box sill and rim joist.

EVALUATION PROCEDURE:

Lay out and installation meets the criteria on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.
blueprint and/or specifications sheet.

Claw hammer (20 oz.)
Measuring tape (12 ft., 25fft., 50 ft. or 100 ft.)
Power hand saw (6½" blade)
Square (combination or framing)

PROCEDURE:

1. Review the materials in Modern Carpentry pertaining to box sill and rim joist.
2. Obtain a blueprint and/or specifications and review it.
3. Obtain the required tools, equipment and supplies needed for box sill and rim joist installation.
4. Complete the layout and installation according to the blueprint and/or specifications.
5. When the job is completed, have it evaluated.
6. Take the LAP test.

Principal Author(s): R. Arneson

CHECKLIST: BOX SILL AND RIM JOIST INSTALLATION

______ Accurate lay out to ± 1/16".

______ Cuts are straight and square.

______ Components are positioned and fastened properly.

______ Practices and procedures followed are compatible with those established in the industry.

Student: ______________________ File Code: 70.01.02.03.A2-2

Date: ______________________ Date Published: 7/5/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: BOX SILL AND RIM JOIST

1. Another name for a header joist is:

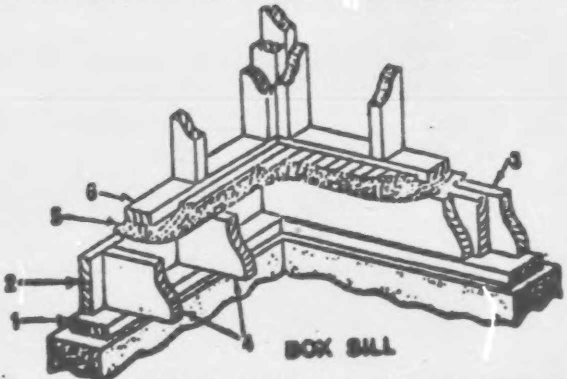
   a. rim joist.
   b. box sill.
   c. tail joist.
   d. cripple joist.

2. If joists are 16" center to center, what are they from one edge of one to the same edge of another?

   a. 15¼"
   b. 15½"
   c. 14½"
   d. 16"

3. In the box sill illustration, which number would correspond to the sill plate or mud sill?

   a. 2
   b. 1
   c. 3
   d. 4



BOX SILL

4. In the box sill illustration, which number would correspond to the header joist?

   a. 3
   b. 2
   c. 4
   d. 5

5. In the box sill illustration, which number would correspond to the floor joist?

   a. 4
   b. 1
   c. 2
   d. 3

6. In the box sill illustration, which number would correspond to the end joist or rim joist?

   a. 2
   b. 3
   c. 4
   d. 1

7. How many joists are required under partitions running parallel with the floor joist?

   a. 1
   b. 2
   c. 3
   d. 4

8. If a partition for a bathroom is running parallel with the floor joist, the floor joist should be:

   a. omitted.
   b. spaced the width of plumbing pipes.
   c. nailed solidly together under the walls.
   d. double the next 16" joist.

9. What size are the joists in the bedrooms? (See plan.)

   a. 2 x 6
   b. 2 x 8
   c. 2 x 10
   d. 2 x 4

10. What size are the floor joists in the living room? (See plan.)

   a. 2 x 12
   b. 2 x 8
   c. 2 x 10
   d. 2 x 6

LAP TEST ANSWER KEY: BOX SILL AND RIM JOIST

1. b
2. d
3. b
4. b
5. a
6. b
7. b
8. b
9. c
10. c

File Code: 70.01.02.04.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.

Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Types of Girders

OBJECTIVES:

Given a blueprint and/or specifications, order the types of girders used by complete description.

Identify characteristics of girders.

EVALUATION PROCEDURE:

The proposed order must include all items required for the given print and/or specifications.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Location and Spacing of Girder Posts" LAP test and is taken after completing that LAP.

RESOURCES:

Blueprint Reading and Sketching, Carpentry Trades, Residential, Delmar Publishers.
Modern Carpentry, Wagner.
Specification sheet.

PROCEDURE:

1. Read pages 111-134 in Modern Carpentry.
2. Using the appropriate print and/or specification, prepare a proposed order for for the girders required by size and weight.
3. Have the proposed order evaluated.
4. Proceed to the next LAP.

Principal Author(s): R. Arneson

File Code. 70.01.02.05.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Location and Spacing of Girder Posts

OBJECTIVE:

Given a blueprint and/or specifications, identify the location of support post and prepare an order for the post(s) by type and size.

EVALUATION PROCEDURE:

Post location and order meets given specifications.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Blueprint Reading and Sketching, Carpentry Trades, Residential, Delmar Publishers.
Modern Carpentry, Wagner.
Specification sheets.

PROCEDURE:

1. Read pages 117-118 in Modern Carpentry.
2. Examine the blueprint and/or specifications.
3. Identify from the print and/or specifications, the span and the spacing of the post(s).
4. Prepare a proposed order for the post(s) by type and size.
5. Have the proposed order evaluated.
6. Take the LAP test.

Principal Author(s): R. Arneson

Student: ____________________ File Code: 70.01.02.04.A2-2
70.01.02.05.A2-2

Date: ____________________ Date Published: 7/5/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: TYPES OF GIRDERS/LOCATION AND SPACING OF GIRDER POSTS

1. What size material will have to be ordered for the beam in the living room? (See plan.)
   - a. 2 x 12
   - b. 2 x 8
   - c. 2 x 10
   - d. 2 x 6

2. What type of girder is the one that supports the living room floor?
   - a. flush (clear span).
   - b. beam/post.
   - c. clear span steel.
   - d. clear span iron.

3. Approximately how long is the beam or girder that supports the living room? (See plan.)
   - a. 16'
   - b. 10'
   - c. 14'
   - d. 12'

4. What size is the girder in the garage area? (See plan.)
   - a. 6 x 8
   - b. 6 x 10
   - c. 2 x 6
   - d. 2 x 8

5. What size material would be used to construct the beam or girder in the garage? (See plan.)
   - a. 2 x 12
   - b. 2 x 6
   - c. 2 x 10
   - d. 2 x 8

6. How many girder supports are there in the garage area? (See plan.)
   - a. two.
   - b. one.
   - c. three.
   - d. four

7. Approximately how far does the beam in the garage have to span? (See plan.)

   a. 15'
   b. 14'
   c. 13'
   d. 16'

8. What supports the beam in the garage area? (See plan.)

   a. wood post.
   b. iron post.
   c. lally column.
   d. adjustable steel post.

9. How many pieces of material would have to be ordered for the girder that supports the living room floor? (See plan.)

   a. 4
   b. 2
   c. 3
   d. 8

10. What size is the member that supports the girder in the living room area at the corner of the porch? (See plan.)

LAP TEST ANSWER KEY: TYPES OF GIRDERS/LOCATION AND SPACING OF GIRDER POSTS

1. c
2. a
3. d
4. a
5. d
6. b
7. c
8. c
9. a
10. b

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.02.06.A2-0

Date Published: 8-18-75

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Floor Joist

OBJECTIVES:

Lay out and install floor joist using established procedures and according to given specifications.

EVALUATION PROCEDURE:

Installation meets the criteria on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Blueprint Reading and Sketching, Carpentry Trades, Residential, Delmar Publishers.
Modern Carpentry, Wagner.
Carpentry, Carpenters Printing Plant.

Claw hammer (20 oz.)
Framing square
Power hand saw (6½" blade)
Tape measure (12 ft.)

PROCEDURE:

1. Read pages 121-130 in Modern Carpentry and pages 23-24, Unit III in Carpentry.
2. Examine the blueprint and/or specifications.
3. Obtain the tools and materials needed to do the job.
4. Complete the floor joist installation. The instructor may have you scale the joist installation.
5. Have the installation evaluated.
6. Return the tools and equipment to their proper places.
7. Take the LAP test.

Principal Author(s): R. Arneson

CHECKLIST: FLOOR JOIST INSTALLATION

______ Fastened properly

______ Neat

______ Square

______ Measurements are accurate to ± 1/8".

______ Procedures are accepted in the industry.

______ Meets specifications.

Student: ______________________ File Code: 70.01.02.06.A2-2

Date: ______________________ Date Published: 7/8/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: FLOOR JOIST

1. When floor joists are turned on edge and sighted, the curved surface is commonly called:

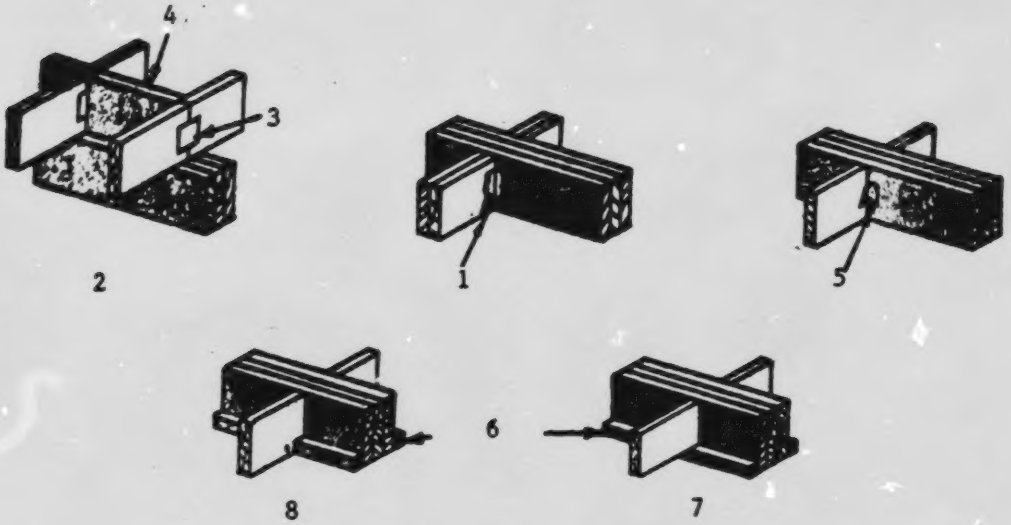
   a. hump.
   b. crown.
   c. level.
   d. salvage.

2. A joist which rests on a masonary wall and has a specially cut end is commonly called a:

   a. perpendicularly cut joist.
   b. diagonally cut joist.
   c. square cut joist.
   d. fire cut joist.

3. The crowns of the floor joist are always turned:

   a. down.
   b. up.
   c. horizontally.
   d. inclined.



PLACING IN LINED JOISTS
Fig. 11A

4. In the illustration figure 11A, which number would correspond to the splice plate?

   a. 3
   b. 1
   c. 5
   d. 6

5. In the illustration figure 11A, which number would correspond to the inline joist illustration?

   a. 2
   b. 1
   c. 8
   d. 7

6. In the illustration figure 11A, which number would correspond to a joist hanger?

   a. 7
   b. 5
   c. 6
   d. 1

7. In the illustration figure 11A, which number would correspond to the solid bridging?

   a. 7
   b. 8
   c. 4
   d. 5

8. In the illustration figure 11A, which number would correspond to a framing anchor?

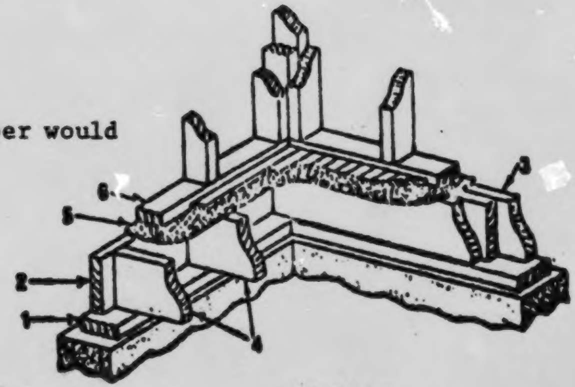
   a. 1
   b. 5
   c. 8
   d. 7

9. In the illustration figure 11A, which number would correspond to the ledger. supported joist illustration without notch?

   a. 5
   b. 8
   c. 1
   d. 7

10. In the box sill illustration, which number would correspond to the sole plate?

   a. 2
   b. 5
   c. 3
   d. 6



BOX SILL

LAP TEST ANSWER KEY: FLOOR JOIST

1. b
2. d
3. b
4. a
5. a
6. d
7. c
8. b
9. d
10. d

File Code: 70.01.02.07.A2-0

Date Published: 8/20/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Solid Bridging

OBJECTIVES:

Lay out, cut and install solid bridging according to specifications following procedures established in the industry.

EVALUATION PROCEDURE:

Installation meets the criteria listed on the attached checklist.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Herringbone Bridging" LAP test and is taken after completing that LAP.

RESOURCES:

Carpentry, "Rough Framing," Carpenters Printing Plant.
Modern Carpentry, Wagner.
Specification sheet.

Claw hammer (20 oz.)
Framing square
Power hand saw (6½" blade).

PROCEDURE:

1. Read pages 106-107 in Modern Carpentry and page 32, Unit III in Carpentry.
2. Obtain the blueprint and/or specifications.
3. Obtain the tools, supplies, and equipment needed for the job.
4. Complete the solid bridging installation.
5. Evaluate the installation using the checklist.

Principal Author(s): R. Arneson

6. Clean up and put the tools and supplies away.
7. Proceed to the next LAP.

CHECKLIST: SOLID BRIDGING INSTALLATION

______ Fastened properly

______ Neat

______ Square

______ Measurements are accurate to ± 1/8"

______ Procedures are accepted in the industry

______ Meets specifications listed.

File Code: 70.01.02.08.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: __________

Date: __________

PERFORMANCE ACTIVITY: Herringbone Bridging

OBJECTIVE:

Identify, cut out, lay out and install herringbone bridging according to specifications and following procedures established in the industry.

EVALUATION PROCEDURE:

Installation meets the criteria on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.
Carpentry, Carpenters Printing Plant.

Claw hammer (16 oz.)
Framing square
Power hand saw (6½" blade)
Tape measure (12 ft.)

PROCEDURE:

1. Read pages 106-107 in Modern Carpentry and pages 36-37, Unit III in Carpentry.
2. Obtain the specifications for installation.
3. Obtain the tools, supplies and equipment needed for this job.
4. Complete the herringbone bridging installation.
5. Have the installation evaluated.
6. Clean up the area and put the tools and supplies away.
7. Take the LAP test.

Principal Author(s): P [illegible]son

CHECKLIST: HERRINGBONE BRIDGING INSTALLATION

______ Fastened properly

______ Neat

______ Square

______ Measurements are accurate to ± 1/8"

______ Procedures are accepted in the industry

______ Meet specifications.

Student: ______________________ File Code: 70.01.02.07.A2-2
70.01.02.08.A2-2

Date: ______________________ Date Published: 7/8/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: SOLID BRIDGING/HERRINGBONE BRIDGING

1. When cross bridging is installed, how is the weight distributed if a man is standing on only one joist?

   a. on one joist.
   b. on several joists.
   c. on two joists.
   d. it is not distributed.

2. How is bridging always located in relation to the joist span?

   a. at center line.
   b. near inside edge.
   c. near outside edge.
   d. ½ the run.

3. What degree of cut is necessary when the ends of bridging are on the flat plane (across the face?)

   a. 75 degree.
   b. 45 degree.
   c. 33.3 degree.
   d. 90 degree.

4. Wood cross bridging is usually made from what length of material?

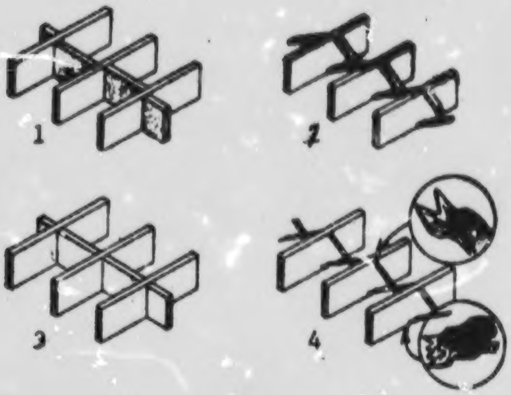
   a. 2"
   b. 1¼"
   c. 1½"
   d. 1"

5. A tack nail stay is used when the purpose of installing cross bridging is to:

   a. toenail ends of bridging.
   b. nail cross bridging in place.
   c. hold joist on center.
   d. maintain firmness of floor.

6. **In the illustration of types of briding, which number would correspond to solid bridging - staggered?**

   a. 4
   b. 2
   c. 3
   d. 1



TYPES OF BRIDGING
Fig. 30

7. In the illustration of types of bridging, which number would correspond to wood cross bridging?

   a. 1
   b. 3
   c. 4
   d. 2

8. In the illustration of types of bridging, which number would correspond to metal cross bridging?

   a. 1
   b. 3
   c. 2
   d. 4

9. Another name for cross bridging is:

   a. valley.
   b. wainscot.
   c. cornice.
   d. herringbone.

10. When are the bottom ends of cross bridging nailed?

    a. second procedure.
    b. first procedure.
    c. after subfloor is on.
    d. before tail joists are installed.

LAP ANSWER KEY: SOLID BRIDGING/HERRINGBONE BRIDGING

1. b
2. a
3. d
4. d
5. c
6. d
7. d
8. d
9. d
10. c

File Code: 70.01.02.09.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________

Date: ______________

PERFORMANCE ACTIVITY: Stair Well

OBJECTIVE:

Prepare the material and install a stair well according to site and specifications and following procedures established in the industry.

EVALUATION PROCEDURE:

Installation meets the criteria on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Carpentry, Carpenters Printing Plant.
Modern Carpentry, Wagner.

Claw hammer (20 oz.)
Framing square
Power hand saw (6½" blade)
Tape measure (12 ft.)

PROCEDURE:

1. Read pages 123-126 in Modern Carpentry and pages 36-37 and 42-44, Unit III in Carpentry.
2. Obtain the blueprint and/or specifications for installation.
3. Obtain the tools, supplies, and materials needed for this job.
4. Complete the stair well installation. The instructor may have you scale this stair well down.
5. Have the installation evaluated.
6. Clean up the area and put the tools and supplies away.
7. Take the LAP test.

Principal Author(s): R. Arneson

CHECKLIST: STAIR WELL INSTALLATION

_____ Fastened properly

_____ Neat

_____ Measurements are accurate to ± 1/8"

_____ Procedures are accepted in the industry

_____ Meets specifications.

Student: ______________________ File Code: 70.01.02.09.A2-2

Date: ______________________ Date Published: 7/8/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: STAIR WELL

1. How are tail joists positioned in relation to the centers of the floor joist?

   a. not placed on the same center.
   b. on alternate layout centers.
   c. on opposite layout centers.
   d. on the same layout centers.

2. At times, tail joists are referred to as:

   a. rim joists.
   b. floor joists.
   c. cripple joists.
   d. headers.

3. In the illustration figure 23, the member(s) labeled number 2 is (are) called which of the following?

   a. floor joist.
   b. tail joist.
   c. headers.
   d. rim joist.

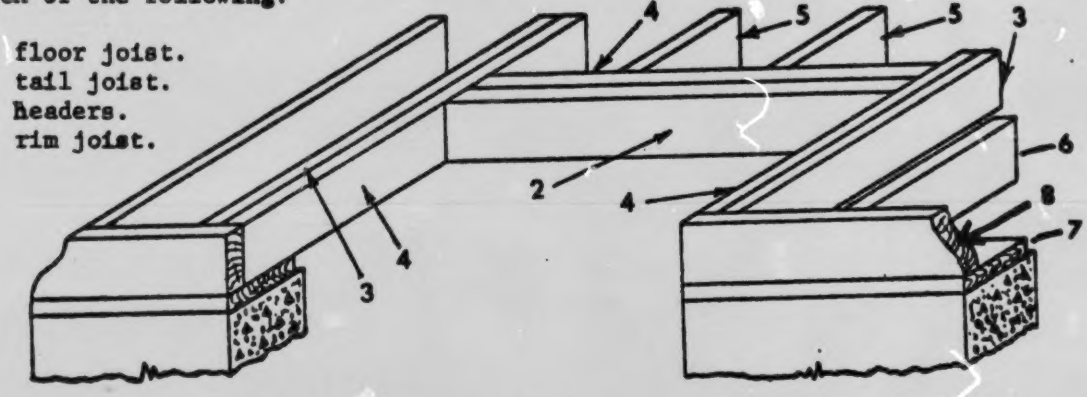


Fig. 23

4. In the illustration figure 23, the member(s) labeled number 8 is (are) called which of the following?

   a. rim joist.
   b. tail joist.
   c. floor joist.
   d. headers

5. In the illustration the member(s) labeled number 3 is (are) called which of the following?

   a. rim joist.
   b. headers.
   c. tail joist.
   d. floor joist (trimmer).

6. In the illustration figure 23, the member(s) labeled number 5 is (are) called which of the following?

   a. cripple (tail) joist.
   b. header joist.
   c. rim joist.
   d. box sill.

7. In the illustration figure 23, the member(s) labeled number 4 is (are) called which of the following?

   a. rim joist.
   b. headers.
   c. floor joist (trimmer).
   d. box sill.

8. In the illustration, the member(s) labeled number 6 is (are) called which of the following?

   a. tail joist.
   b. headers.
   c. box sills.
   d. floor joist.

9. In figure 23 of a stairwell opening, which number would correspond to the first member(s) to be installed when making a stairwell?

   a. 1
   b. 4
   c. 2
   d. 3

10. In figure 23 of a stairwell opening, which number would correspond to the second member(s) to be installed when making a stairwell?

    a. 1
    b. 2
    c. 3
    d. 5

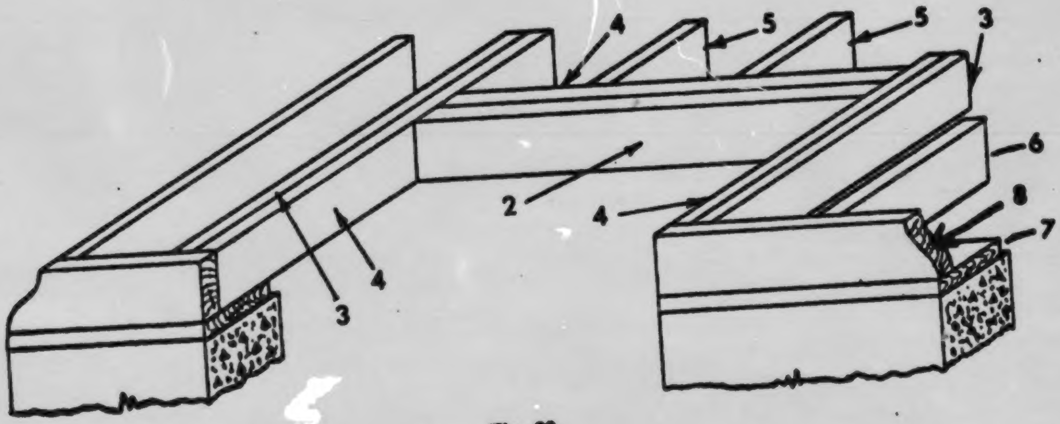


Fig. 23

LAP TEST ANSWER KEY: STAIR WELL

1. d
2. c
3. c
4. a
5. d
6. a
7. c
8. d
9. b
10. b

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.02.10.A2-0

Date Published: 8-18-75

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Floor Frame Straightening and Bracing

OBJECTIVES:

Straighten and brace the floor framing according to given specifications and following procedures established in the industry.

EVALUATION PROCEDURE:

The straightening and bracing meets the criteria on the attached checklist.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Subfloor" LAP test that is taken after completing that LAP.

RESOURCES:

Claw hammer (20 oz.)
Power hand saw (8¼" blade)
Spirit level
Square (combination or framing)
Tape measure (25 ft.)

PROCEDURE:

1. Obtain specifications and procedures from the instructor.
2. Obtain the tools and materials needed for this job.
3. Complete the assigned project.
4. Have the floor framing evaluated.
5. Clean up the area and put the tools and supplies away.
6. Proceed to the next LAP.

Principal Author(s): R. Arneson
T. Frisbee

Check List: Floor Frame Straightening and Bracing

________ Fastened properly.

________ Neat.

________ Square.

________ Measurements are accurate to ± 1/8 inch.

________ Procedures are accepted in the industry.

________ Meets specifications.

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.02.11.A2-0

Date Published: 8-18-75

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Subfloor

OBJECTIVE:

Install the subfloor according to the blueprint and/or specifications following procedures established in the industry.

EVALUATION PROCEDURE:

Installation meets the criteria on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Carpentry, Carpenters Printing Plant.
Modern Carpentry, Wagner.

Chalk line
Claw hammer (20 oz.)
Power hand saw (6½" blade)

PROCEDURE:

1. Read page 129 in Modern Carpentry and pages 53-59, Unit III in Carpentry.
2. Obtain the blueprint and/or specifications.
3. Obtain the tools, supplies and materials needed for this job.
4. Complete the subfloor installation.
5. Have the subfloor evaluated using the checklist.
6. Clean up the area and put the tools and supplies away.
7. Take the LAP test.

Principal Author(s): R. Arneson

CHECKLIST: SUB FLOOR INSTALLATION

______ Fastened properly

______ Neat

______ Square

______ Measurements are accurate to ± 1/8"

______ Procedures are accepted in the industry

______ Meets specifications.

Student: ______________________ File Code: 70.01.02.10.A2-2
70.01.02.11.A2-2

Date: ______________________ Date Published: 7/8/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: FLOOR FRAME STRAIGHTENING AND BRACING/SUBFLOOR

1. The method commonly used to straighten floor framing is the:

   a. transit method.
   b. line and block method.
   c. level method.
   d. plumb bob method.

2. If the width of subflooring boards is less than six inches, how many nails are required in each board?

   a. three.
   b. two.
   c. four.
   d. five.

3. The nails on the edge of the plywood should be spaced less than how many inches apart?

   a. 6"
   b. 8"
   c. 10"
   d. 12"

4. The nails on the center portion of plywood should be spaced less than how many inches apart?

   a. 12"
   b. 6"
   c. 8"
   d. 10"

5. When the diagonal measurement is equal when straightening floor framing, then the framing is:

   a. ready for subflooring.
   b. straight.
   c. square.
   d. finished.

6. After the box sill and rim joist have been straightened, they must be toenailed to:

   a. the foundation.
   b. the sill plate.
   c. the floor joist.
   d. the trimmers.

7. If subfloor is run square across the floor joist, which way must the finish floor run?

   a. across the floor joist.
   b. with the floor joist.
   c. along the floor joist.
   d. T & G with the floor joist.

8. When laying plywood on floor joists, how many joists should be between joints on the sheets of plywood to prevent breakage on the same joist?

   a. 1
   b. 2
   c. 3
   d. 4

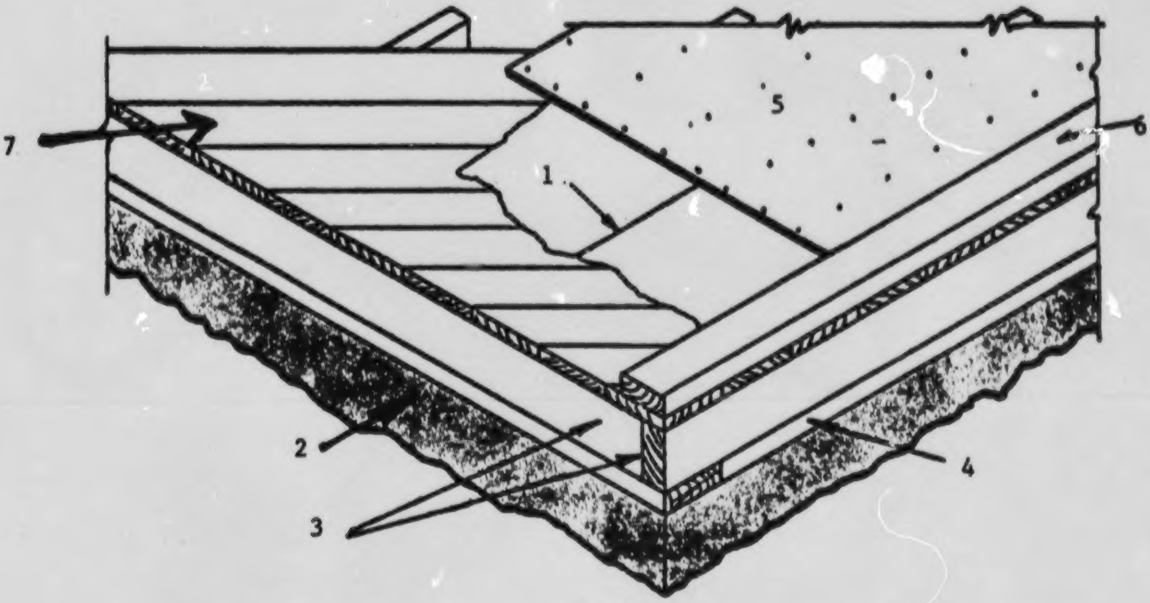


Fig. 38

9. In the illustration figure 38, which number would correspond to the subfloor?

   a. 6
   b. 1
   c. 5
   d. 7

10. In the illustration figure 38, which number would correspond to the sill plate?

   a. 4
   b. 6
   c. 7
   d. 4

70.01.02.10.A2-2
70.01.02.11.A2-2

LAP TEST ANSWER KEY: FLOOR FRAME STRAIGHTENING AND BRACING/SUBFLOOR LOOK

1. b
2. b
3. a
4. d
5. c
6. b
7. b
8. a
9. d
10. d

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.02.12.A2-0

Date Published: 8-18-75

Learning Activity Package

Student:

Date:

PERFORMANCE ACTIVITY: Materials for a Floor

OBJECTIVE:

Given specifications, prepare a proposed order for floor materials needed to complete a specific floor installation.

EVALUATION PROCEDURE:

Proposed order is accurate by quantity and description.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.
Specifications, floor

PROCEDURE:

1. Read pages 132-133 in Modern Carpentry.
2. Obtain the specifications.
3. List the materials and determine the quantities needed.
4. Complete the proposed order.
5. Have the proposed order evaluated.
6. Take the LAP test.

Principal Author(s): R. Arneson

Student: ______________________ File Code: 70.01.02.12.A2-2

Date: ______________________ Date Published: 7/8/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: MATERIALS FOR A FLOOR

1. When joists are doubled for additional support:

   a. the O. C. spacing is increased.
   b. the length of the bridging is not changed.
   c. the plywood subfloor cannot be used.
   d. none of the above.

2. How long is the house including the garage? (See plan.)

   a. 17'4"
   b. 24'0"
   c. 22'6"
   d. 63'10"

3. Approximately how many feet of sill plate will be needed for this house? (See plan.)

   a. 350'
   b. 275'
   c. 150'
   d. 190'

4. What is the dimension of the box sill and rim joist? (See plan.)

   a. 2 x 12
   b. 2 x 8
   c. 2 x 10
   d. 2 x 6

5. What size is the sill plate in the garage? (See plan.)

   a. 2 x 4
   b. 2 x 6
   c. 4 x 6
   d. 2 x 8

6. Approximately how many lineal feet of sill plate will be required for the garage area? (See plan.)

   a. 60'
   b. 74'
   c. 90'
   d. 24'

7. What size are the floor joists in the bedroom area? (See Plan)

   a. 2 x 10
   b. 2 x 12
   c. 2 x 8
   d. 2 x 6

8. How many floor joists are required every four feet in this house? (See plan.)

   a. 5
   b. 2
   c. 4
   d. 3

9. What is the spacing of the floor joists in this home? (see plan.)

   a. 16" O.C.
   b. 20" O.C.
   c. 24" O.C.
   d. 36" O.C.

10. The subfloor, over which asphalt tile will be laid, requires what material? (See specs.)

   a. sheetrock.
   b. plywood.
   c. 1 x 8 boards.
   d. 1 x 4 boards.

LAP TEST ANSWER KEY: MATERIALS FOR A FLOOR

[illegible]

1. d
2. d
3. d
4. c
5. a
6. a
7. a
8. d
9. a
10. b

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.02.13.A2-0

Date Published: 8-18-75

Learning Activity Package

Student:

Date:

PERFORMANCE ACTIVITY: Wall Section

OBJECTIVE:

Sketch a specified wall section and label all members in the section.

EVALUATION PROCEDURE:

Sketch meets the criteria listed in the resource material, Fig. 54 in Modern Carpentry.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Carpentry, Carpenters Printing Plant.
Modern Carpentry, Wagner.

PROCEDURE:

1. Read pages 135-139 in Modern Carpentry and pages 75-76, Unit III in Carpentry.
2. Obtain an 8½" x 11" sheet of paper and a pencil and specifications.
3. Make a sketch of a specified wall section and label the members.
4. Have the sketch evaluated.
5. Take the LAP test.

Principal Author(s): R. Arneson

Student: ____________________ File Code: 70.01.02.13.A2-2

Date: ____________________ Date Published: 7/8/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: WALL SECTION

1. In figure 54, which number would correspond to the cripple studs?

   a. 1
   b. 9
   c. 10
   d. 11

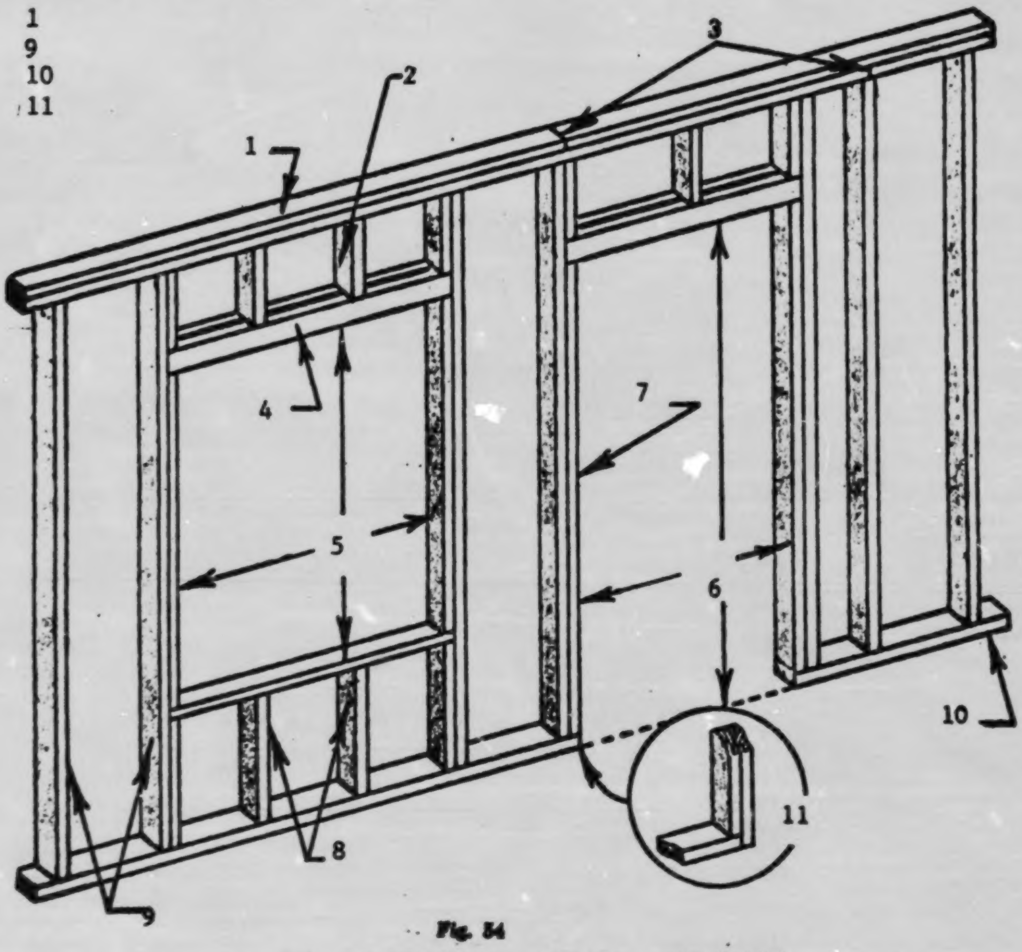


Fig. 54

A TYPICAL WALL FRAME

2. In figure 54, which number would correspond to the trimmer stud?

   a. 1
   b. 9
   c. 10
   d. 7

3. In figure 54, which number would correspond to the sole plate?

   a. 11
   b. 1
   c. 10
   d. 2

4. In figure 54, which number would correspond to the double header?

   a. 6
   b. 7
   c. 4
   d. 9

5. In figure 54, which number would correspond to the broken plate joints?

   a. 11
   b. 10
   c. 6
   d. 3

6. In figure 54, which number would correspond to the top double plate?

   a. 1
   b. 9
   c. 10
   d. 11

7. In figure 54, which number would correspond to the window rough opening?

   a. 6
   b. 5
   c. 11
   d. 3

8. In figure 54, which number would correspond to the door rough opening?

   a. 6
   b. 5
   c. 4
   d. 11

9. The member that runs from the sole plate to the header on a rough opening is called a:

   a. cripple stud.
   b. trimmer stud.
   c. stagger joint.
   d. double header.

10. The member that runs from the sole plate to the bottom double plate on a wall section is called a:

    a. double header.
    b. cripple stud.
    c. stud.
    d. trimmer stud.

LAP TEST: WALL SECTION

1. d
2. d
3. c
4. c
5. d
6. a
7. b
8. d
9. b
10. c

File Code: 70.01.02.14.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Size of Headers

OBJECTIVES:

Determine and list the headers required according to specifications, following procedures established in the industry.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.
Specification sheet

PROCEDURE:

1. Read page 137 in Modern Carpentry.
2. Obtain the specifications for a header.
3. Determine the size of specified header(s).
4. Obtain evaluation of header determination(s).
5. Take the LAP test.

Principal Author(s): R. Arneson
T. Frisbee

Student: ____________________ File Code: 70.01.02.14.A2-2

Date: ____________________ Date Published: 7/8/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: SIZE OF HEADERS

HEADER SPANS

Material on Edge	Supporting one floor, ceiling, roof	Supporting only ceiling and roof
2 x 4	3' - 0"	3' - 6"
2 x 6	5' - 0"	6' - 0"
2 x 8	7' - 0"	8' - 0"
2 x 10	8' - 0"	10' - 0"
2 x 12	9' - 0"	12' - 0"

1. Using the table above, what size header would be required for doors lettered M in the house plan? (See plan.)

   a. 2 x 4
   b. 2 x 6
   c. 2 x 8
   d. 2 x 10

2. Using the table on header spans, what size header would be required for openings labeled letter N in the house? (See plan.)

   a. 2 x 10
   b. 2 x 6
   c. 2 x 8
   d. 2 x 4

3. Using the table above, what size header would be required for doors lettered A in the house plan? (See plan.)

   a. 2 x 8
   b. 2 x 6
   c. 2 x 4
   d. 2 x 10

4. Using the table on header spans, what size header would be required for openings labeled letter F in the house? (See plan.)

   a. 2 x 4
   b. 2 x 6
   c. 2 x 8
   d. 2 x 10

5. Using the table on header spans, what size header would be required for openings labeled letter L in the house? (See plan.)

   a. 2 x 6
   b. 2 x 10
   c. 2 x 12
   d. 2 x 8

6. Using the table on header spans, what size header would be required for windows numbered 7 in the house plan? (See plan.)

   a. 2 x 10
   b. 2 x 12
   c. 2 x 8
   d. 2 x 6

7. Using the table on header spans, what size header would be required for openings labeled number 10 in the house? (See plan.)

   a. 2 x 12
   b. 2 x 10
   c. 2 x 6
   d. 2 x 8

8. Using the table on header spans, what size header would be required for openings labeled number 12 in the house? (See plan.)

   a. 2 x 10
   b. 2 x 6
   c. 2 x 8
   d. 2 x 4

9. Using the table on header spans, what size headers would be needed in the back bedroom SE elevation? (See plan.)

   a. 2 x 12
   b. 2 x 4
   c. 2 x 10
   d. 2 x 6

10. Using the table on header spans, what size headers would be used for the rough opening in the front bedroom NE elevation? (See plan.)

    a. 2 x 6
    b. 2 x 10
    c. 2 x 12
    d. 2 x 8

HEADER SPANS

Material on Edge	Supporting one floor, ceiling, roof	Supporting only ceiling and roof
2 x 4	3' - 0"	3' - 6"
2 x 6	5' - 0"	6' - 0"
2 x 8	7' - 0"	8' - 0"
2 x 10	8' - 0"	10' - 0"
2 x 12	9' - 0"	12' - 0"

LAP TEST ANSWER KEY: SIZE OF HEADERS

REQUIRED

1. a
2. d
3. c
4. a
5. d
6. b
7. a
8. d
9. d
10. d

File Code: 70.01.02.15.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Height of Headers

OBJECTIVE:

Determine the height of headers according to specifications and following procedures established in the industry.

EVALUATION PROCEDURE:

Heights meet the criteria on the specifications.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.
Specification sheet.

PROCEDURE:

1. Read pages 123-126 in Modern Carpentry.
2. Obtain the specifications.
3. Determine height of header.
4. Have the heights evaluated.
5. Take the LAP tests.

Principal Author(s): R. Arneson

Student: ____________________ File Code: 70.01.02.15.A2-2

Date: ____________________ Date Published: 7/8/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: HEIGHT OF HEADERS

1. In the plan provided, where on the floor plan are the dimensions measured? (See note on plan.)
   - a. from center to center.
   - b. from center of stud.
   - c. from the outside edge of studs.
   - d. from inside edge of studs.

2. The members that support the headers in a wall section are called:
   - a. sills.
   - b. studs.
   - c. trimmers.
   - d. plates.

3. How many inches usually must be added to the rough opening width to determine the length of a header?
   - a. 4½"
   - b. 1½"
   - c. 3"
   - d. 6"

4. What is the height to the headers measured from the finished floor in the wall section? (See plan.)
   - a. 6'8½"
   - b. 6'8"
   - c. 6'10½"
   - d. 6'9½"

5. What is the height to the headers measured from the subfloor of the wall section? (See plan.)
   - a. 6'9½"
   - b. 6'10½"
   - c. 6'8"
   - d. 6'8 3/4"

6. What is the height to the headers measured from the bottom of the sole plate in the wall section of the house? (See plan.)
   - a. 6'8½"
   - b. 6'10½"
   - c. 6'8"
   - d. 6'9½"

7. What is the height to the headers measured from the top of the sole plate in the wall section of the house? (See plan.)

   a. 6'8"
   b. 6'9"
   c. 6'10½"
   d. 6'8½"

8. What is the length of the trimmers to be used with the headers for support in the wall section of the house? (See plan.)

   a. 6'8"
   b. 6'9"
   c. 6'10½"
   d. 6'8½"

9. Allowing 1" to square the window in the rough opening, what length are the headers in the bedrooms (see plan) SW elevation? Add 3" for the mullion.

   a. 5'4"
   b. 2'6"
   c. 2'7"
   d. 2'9½"

10. Allowing 1" to square the window in the rough opening, what length are the headers in the living room of the house (see plan) SW elevation?

   a. 10'9"
   b. 11'
   c. 10'10"
   d. 11'1"

LAP TEST ANSWER KEY: HEIGHT OF HEADERS

1. c
2. c
3. c
4. d
5. b
6. b
7. b
8. b
9. a
10. d

File Code: 70.01.02.16.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Length and Spacing of Studs

OBJECTIVE:

Determine the length and spacing of studs according to specifications following procedures established in the industry.

EVALUATION PROCEDURE:

Length and spacing meet the criteria listed on the specifications.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Stud Installation" LAP test and is taken after completing that LAP.

RESOURCES:

Carpentry, Carpenters Printing Plant.
Modern Carpentry, Wagner.

PROCEDURE:

1. Read page 140 in Modern Carpentry and pages 64-90, Unit III in Carpentry.
2. Obtain specifications.
3. Determine length and spacing of studs.
4. Have determinations evaluated.
5. Proceed to next LAP.

Principal Author(s): R. Arneson
T. Frisbee

File Code: 70.01.02.17.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Location of All Plates

OBJECTIVE:

Lay out the location of plates according to specifications following procedures established in the industry.

EVALUATION PROCEDURE:

Plate location layout meets criteria on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Carpentry, Carpenters Printing Plant.
Modern Carpentry, Wagner.

Chalk box
Chalk line
Tape measure (16, 20, or 25 ft.)

PROCEDURE:

1. Read pages 139-140 in Modern Carpentry and pages 73-79, Unit III in Carpentry.
2. Obtain the specifications.
3. Obtain the tools, supplies and materials needed for this job.
4. Complete the layout.
5. Have layout evaluated.
6. Clean up the area and put the tools and supplies away.
7. Take the LAP test.

Principal Author(s): R. Arneson

CHECKLIST: PLATE LOCATION

____________ Neat

____________ Measurements are accurate to ± 1/8"

____________ Procedures are accepted in the industry

____________ Meets specifications.

Student: ______________________________ File Code: 70.01.02.17.A2-2

Date: ______________________________ Date Published: 7/8/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: LOCATION OF ALL PLATES

1. In relation to the outside of the structure to the interior partition location, where are most layouts of plates measured?

   a. from inside edge to center.
   b. from center to center.
   c. from center to inside edge.
   d. from outside to center.

2. In the largest bedroom, how far is it from the south corner of the structure to the bathroom partition? (See plan.) (Include SE elevation.)

   a. 13'9"
   b. 12'9"
   c. 17'4"
   d. 8'0"

3. What is the total width of the bathroom partition measured from NE center to SW center? (See Plan)

   a. 10'9"
   b. 8'0"
   c. 17'4"
   d. 12'9"

4. How deep is the bathroom from the outside wall to the inside partition that has a door in it? (See Plan)

   a. 8'0"
   b. 10'4"
   c. 10'½"
   d. 10'2¼"

5. What is the width of the passageway between the bedrooms center to center? (See plan.)

   a. 8'0"
   b. 3'7¼"
   c. 3'5½"
   d. 3'9"

6. How wide is the living room center to center? (See plan.)

   a. 14'10½"
   b. 14'7"
   c. 14'9"
   d. 14'8"

7. How wide is the living room inside the wood framing? (See Plan)

   a. 14'10½"
   b. 14'7"
   c. 14'9"
   d. 14'8"

8. How long is the living room outside to center of the inside partition? (See plan.)

   a. 23'3"
   b. 23'4½"
   c. 24'2"
   d. 25'7"

9. How long is the living room from inside the outside wall to the inside partition? (See plan.)

   a. 23'4½"
   b. 23'3"
   c. 22'11½"
   d. 25'7"

10. How wide is the porch outside to outside? (See Plan)

   a. 7'8½"
   b. 7'11½"
   c. 7'9"
   d. 7'

LAP TEST ANSWER KEY: LOCATION OF ALL PLATES

1. d
2. a
3. b
4. d
5. d
6. a
7. b
8. a
9. c
10. b

File Code: 70.01.02.18.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Plate Installation

OBJECTIVE:

Lay out, prepare and install plates according to specifications following procedures established in the industry.

EVALUATION PROCEDURE:

Plate installation meets the criteria on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Carpentry, Carpenters Printing Plant.
Modern Carpentry, Wagner.

Adjustable wrench
Claw hammer (20 oz.)
Combination square
Power hand drill and bits
Power hand saw (6½" blade)
Tape measure (12, 16, 20, or 25 ft.)

PROCEDURE:

1. Read pages 139-142 in Modern Carpentry and pages 73-79, Unit III in Carpentry.
2. Obtain the specifications.
3. Obtain the tools, supplies and materials needed for this job.
4. Complete the plate layout and installation.
5. Have the installation evaluated.
6. Clean up the area and put the tools and supplies away.
7. Take the LAP test.

Principal Author(s): R. Arneson

CHECKLIST: PLATE INSTALLATION

_____ Fastened properly

_____ Neat

_____ Square

_____ Measurements are accurate to ± 1/8"

_____ Procedures are accepted in the industry

_____ Meets specifications.

Student: ______________________ File Code: 70.01.02.18.A2-2

Date: ______________________ Date Published: 7/8/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: PLATE INSTALLATION

1. When considering intersecting partitions, the top plate that runs into the outside wall must be:

   a. cut flush with the bottom plate.
   b. extended over the bottom plate.
   c. cut back from the bottom plate.
   d. extended ½ the thickness of the wall.

2. The use of a stud template for quantity cutting of studs, trimmers, cripples and headers:

   a. avoids errors.
   b. all of these.
   c. reduces variation in uniform lengths.
   d. avoids repetitive measurements.

3. A trussed opening in a wall frame section:

   a. distributes the weight to the studs and trimmers.
   b. replaces the double header.
   c. eliminates a center support in the opening.
   d. provides an additional nailing surface.

4. The header sill in a 10'-0" width rough opening window sill is doubled to:

   a. provide additional support for the finish window sill.
   b. keep from using solid stock.
   c. make the dwarf wall section rigid and keep it in line for the finished window.
   d. strengthen the top wall plate.

5. The raising of interior partitions in Western Framing Construction usually begins with:

   a. the longest partition that runs parallel to the long dimension of the building.
   b. reading the planned sequence noted on the framing details of the building plan.
   c. the longest partition that runs parallel to the short dimension of the building.
   d. the shortest partition that runs parallel to the long dimension of the building.

6. A properly placed diagonal let-in brace is:

   a. let-in to the top plate and bottom plate.
   b. butted and blocked to the top plate.
   c. butted and blocked to the sole plate.
   d. let-in to the top plate and blocked to the sole plate.

7. The purpose of the doubled plate in Western Frame Construction is:

   a. to add strength to the top of the wall.
   b. to tie (by lapping) intersecting walls.
   c. strengthen the upper plate joints.
   d. all of the above.

8. Fire blocking is required when:

   a. the wall is under 8'6"
   b. the wall is over 8'0"
   c. the wall is under 8'0"
   d. the wall is over 9'0"

9. What is the minimum length the top plate splices should be from lower top plate splices?

   a. 2'
   b. 3'
   c. 4'
   d. 5'

10. In figure 64 illustration B depicts which of the following?

   a. trimmer.
   b. corner.
   c. partition.
   d. splice.

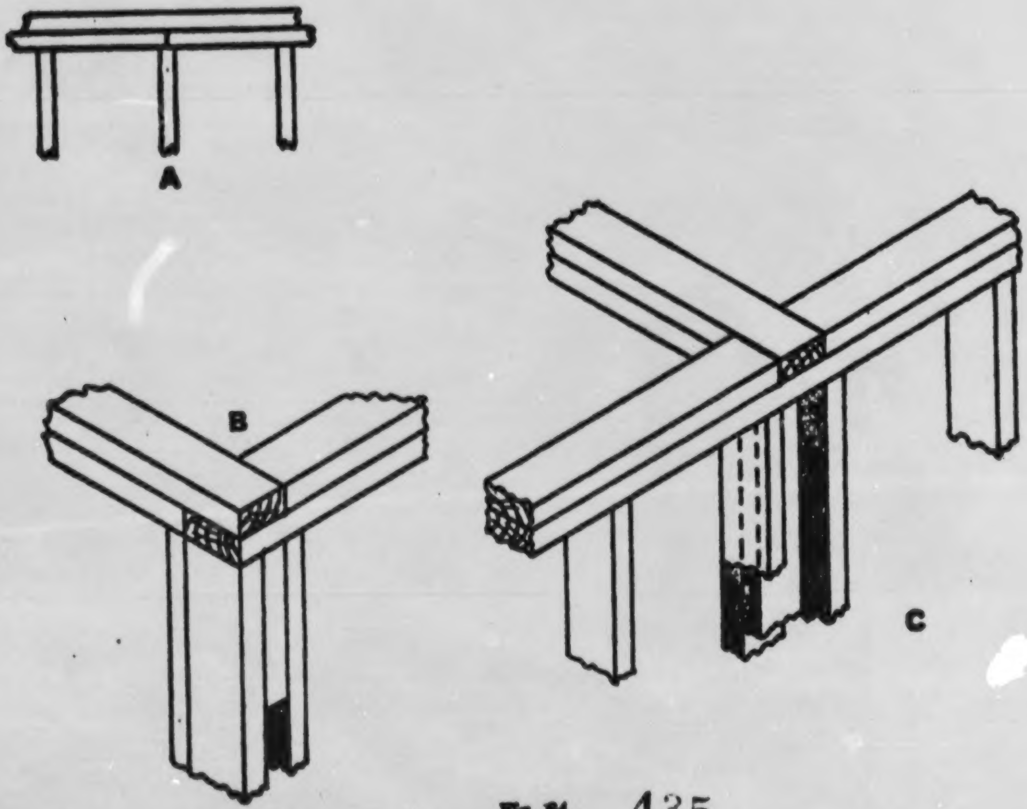


Fig. 64

LAP TEST ANSWER KEY: PLATE INSTALLATION

1. b
2. b
3. a
4. d
5. a
6. a
7. d
8. d
9. c
10. c

File Code: 70.01.02.19.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Stud Installation

OBJECTIVE:

Cut and install studs according to specifications following procedures established in the industry.

EVALUATION PROCEDURE:

The installation meets the criteria on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Carpentry, Carpenters Printing Plant.
Modern Carpentry, Wagner.

Claw hammer (20 oz.)
Combination square
Power hand saw (6½" blade)
Tape measure (12 ft.)

PROCEDURE:

1. Read pages 139-143 in Modern Carpentry and pages 65-90, Unit III in Carpentry.
2. Obtain the specifications.
3. Obtain the tools, supplies and materials needed for this job.
4. Complete the stud installation.
5. Have the installation evaluated.
6. Clean up the area and put the tools and supplies away.
7. Take the LAP test.

Principal Author(s): R. Arneson

CHECKLIST: STUD INSTALLATION

_____ Fastened properly

_____ Neat

_____ Square

_____ Measurements are accurate to ± 1/8"

_____ Procedures are accepted in the industry

_____ Meets specifications.

Student: ____________________ File Code: 70.01.02.16.A2-2
70.01.02.19.A2-2

Date: ____________________ Date Published: 7/8/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: LENGTH AND SPACING OF STUDS/STUD INSTALLATION

1. What is the spacing of the studs in the house plan?

   a. 18" O.C.
   b. 12" O.C.
   c. 20" O.C.
   d. 16" O.C.

2. What is the standard pre-cut stud length?

   a. 90"
   b. 91½"
   c. 92½"
   d. 90½"

3. The most effective saw to use when cutting dimension lumber to length is the:

   a. skill saw.
   b. table saw.
   c. radial saw.
   d. hand saw.

4. A name for the member at the bottom of a window rough opening is:

   a. trimmer.
   b. plate.
   c. box sill.
   d. sill header.

5. Which of the following is a common symbol for a stud when installing studs?

   a. XT
   b. S
   c. T
   d. X

6. A member that runs from plate to plate in a wall section is called a:

   a. stud.
   b. rafter.
   c. cripple.
   d. trimmer.

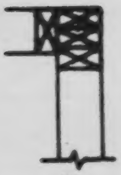
7. A member that runs from plate to sill in a wall section is called a:

   a. stud.
   b. trimmer.
   c. cripple.
   d. header.

8. A member that runs on a horizontal plane and spans an opening in a wall section is called a:

   a. cripple.
   b. trimmer.
   c. header.
   d. stud.

9. A member that has a configuration like this figure A is a:

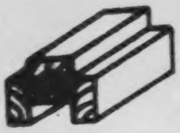


A

   a. trimmer stud.
   b. partition stud.
   c. cripple stud.
   d. corner stud.

10. A member in a wall section that has an arrangement like figure E is called a:

   a. partition stud.
   b. outside corner stud.
   c. cripple stud.
   d. trimmer stud.



E

LAP TEST ANSWER KEY: LENGTH AND SPACING OF STUDS/STUD INSTALLATION

1. d
2. c
3. c
4. d
5. d
6. a
7. c
8. c
9. d
10. a

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.02.20.A2-0

Date Published: 8-18-75

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Squaring a Wall Section

OBJECTIVE:

Using the diagonal method, square a wall section according to specifications following procedures established in the industry.

EVALUATION PROCEDURE:

Wall section meets the criteria on the attached checklist.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Plumbing a Wall Section" and "Wall Sheathing" LAP test and is taken after completing "Wall Sheathing" LAP.

RESOURCES:

Carpentry, Carpenters Printing Plant.
Modern Carpentry, Wagner.

Claw hammer (20 oz.)
Framing square
Tape measure (25 or 50 ft.)

PROCEDURE:

1. Read page 88 in Modern Carpentry and page 74, Unit III in Carpentry.
2. Obtain the specifications.
3. Obtain the tools, supplies and materials needed for squaring a wall section.
4. Square the wall section.
5. Have the squared wall section evaluated.
6. Clean up the area and put the tools and supplies away.
7. Proceed to the next LAP.

Principal Author(s): R. Arneson

CHECKLIST: SQUARING A WALL SECTION

______ Neat

______ Square

______ Measurements are accurate to ± 1/8"

______ Procedures are accepted in the industry.

______ Meets specifications..

File Code: 70.01.02.21.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Plumbing a Wall Section

OBJECTIVE:

Using a spirit level, plumb a wall section according to specifications following procedures established in the industry.

EVALUATION PROCEDURE:

Wall section meets criteria on attached checklist.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Wall Sheathing" LAP test and is taken after completing that LAP.

RESOURCES:

Carpentry, Carpenters Printing Plant.
Modern Carpentry, Wagner.

Claw hammer (20 oz.)
Spirit level

PROCEDURE:

1. Read pages 142-143 in Modern Carpentry and pages 80-81 and 84, Unit III in Carpentry.
2. Obtain the specifications.
3. Obtain the tools needed to plumb a wall section.
4. Plumb the wall section.
5. Have the wall section evaluated.
6. Put tools away.
7. Proceed to the next LAP.

Principal Author(s): R. Arneson

70.01.02.21.A2-0

CHECKLIST: PLUMBING A WALL SECTION

______ Fastened properly

______ Neat

______ Square

______ Measurements are accurate to ± 1/8"

______ Procedures are accepted in the industry

______ Meets specifications.

File Code: 70.01.02.22.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Wall Sheathing

OBJECTIVE:

Sheath walls according to specifications, following procedures established in the industry.

EVALUATION PROCEDURE:

Sheathed wall meets criteria on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Carpentry, Carpenters Printing Plant.
Modern Carpentry, Wagner.

Chalk line
Claw hammer (16 oz.)
Power hand saw (6½" blade)
Spirit level

PROCEDURE:

1. Read pages 145-151 in Modern Carpentry and pages 74-90, Unit III in Carpentry.
2. Obtain the specifications.
3. Obtain the tools, supplies and materials needed to sheath the walls.
4. Sheath the walls.
5. Sheathed wall is evaluated.
6. Clean up the area and put tools and supplies away.
7. Take LAP test.

Principal Author(s): R. Arneson

CHECKLIST: SHEATHING WALLS

_____ Fastened properly

_____ Neat

_____ Square

_____ Measurements are accurate to ± 1/8"

_____ Procedures are accepted in the industry

_____ Meets specifications.

70.01.02.20.A2-2
70.01.02.21.A2-2

Student: ______________________ **File Code:** 70.01.02.22.A2-2

Date: ______________________ **Date Published:** 7/8/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: SQUARING A WALL SECTION/PLUMBING A WALL SECTION/ WALL SHEATHING

1. In two story structures, the exterior wall studs extend from the sill plate to the double top plate in:

    a. balloon framing.
    b. post and beam framing.
    c. western framing.
    d. modern braced framing.

2. The ledger used for second floor joists in balloon framing:

    a. is let-in to the studs.
    b. all of these.
    c. serves to mark the rough ceiling height.
    d. is placed level.

3. A face nail makes the strongest joist when:

    a. driven below the surface of the wood.
    b. the shank is not ringed.
    c. the pull (withdrawal) is with the load.
    d. the load is at 90 degrees to the driven nail.

4. The layout marks "X", "T" and "C" when used in wall frame sections indicate the location of:

    a. braces, trimmers and bridging.
    b. trimmers, cripples and headers.
    c. studs, trimmers and cripples.
    d. X bracing, trusses and corbels.

5. In balloon framing for two story construction the ribband board is:

    a. nailed to the stud thickness dimension.
    b. let-in to the stud thickness dimension.
    c. nailed to the stud width.
    d. let-in to the stud width.

6. A two story structure that requires placing firestops in the wall section is framed by:

    a. post and beam framing.
    b. western framing.
    c. balloon framing.
    d. modern braced framing.

7. The outside rough covering of a wall section is called:

   a. plywood.
   b. sheeting.
   c. sheathing.
   d. particle board.

8. A tool used to position walls square with a level floor is a:

   a. tri-square.
   b. level.
   c. combination square.
   d. bevel square.

9. When plumbing a wall with a level, which of the following tools is also required to do an accurate job?

   a. straight edge with blocks
   b. plumb bob with block.
   c. string with block.
   d. square with block.

10. If a diagonal brace is installed in a wall, which of the following conditions must exist?

    a. it must extend outside the framing.
    b. it must be flush with outside framing.
    c. it must be inside the framing.
    d. it must be flush with inside framing.

LAP TEST ANSWER KEY: SQUARING A WALL SECTION/PLUMBING A WALL SECTION/ WALL SHEATHING

1. a
2. b
3. a
4. b
5. b
6. c
7. c
8. b
9. a
10. b

File Code: 70.01.02.23.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Materials for Wall Sections

OBJECTIVE:

List the materials needed for a wall section given specifications.

EVALUATION PROCEDURE:

List must contain all items in quantities needed to meet specifications.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Blueprint Reading and Sketching, Carpentry Trades, Residential, Delmar Publishers.
Modern Carpentry, Wagner.

PROCEDURES:

1. Read pages 154-155 in Modern Carpentry.
2. Review the sections about bill of materials found in the listed resource materials.
3. Obtain specifications for wall section.
4. List the materials required for the given wall section.
5. Have the materials list evaluated.
6. Take the LAP test.

Note: Be specific and meticulous.

Principal Author(s): R. Arneson
T. Frisbee

Student: ______________________ File Code: 70.01.02.23.A2-2

Date: ______________________ Date Published: 7/8/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: MATERIALS FOR WALL SECTIONS

1. How many trimmer studs will be needed in the SE wall section of the house? (See plan.)

   a. four.
   b. eight.
   c. two.
   d. six.

2. Approximately how many cripple studs will be needed in the SE wall section of the house? (See plan.)

   a. 2
   b. 10
   c. 5
   d. 6

3. The partition studs in the SE wall will require how many full length studs? (See plan.)

   a. four.
   b. two.
   c. seven.
   d. eight.

4. Approximately how many studs will be required on the SE wall which includes the two bedrooms and the bath? (See plan.)

   a. 35
   b. 22
   c. 13
   d. 31

5. How many typical outside wood corner stud assemblies are there in the SE wall of the house? (See plan.)

   a. 1
   b. 0
   c. 2
   d. 3

6. How many partition stud assemblies are there in the SE wall of the house? (See plan.)

   a. three.
   b. one.
   c. two.
   d. four.

7. How many rough openings will have to be constructed in the SE wall of the house? (See plan.)

   a. three.
   b. two.
   c. five.
   d. four.

8. If the headers in the SE wall are to be constructed of 2 x 6, what length of 2 x 6 will be required for each bedroom window rough opening? (See plan.)

   a. 3'
   b. 10'
   c. 12'
   d. 5'

9. How many L/F (linear feet) will be needed for the top plates on the SE wall section of the house? (See plan.)

   a. 70'
   b. 35'
   c. 105'
   d. 140'

10. How many typical wood corner assemblies will be required for the front wall of the bedroom? (see NE elevation and floor plan.)

    a. one.
    b. two.
    c. three.
    d. four.

LAP TEST ANSWER KEY: MATERIALS FOR WALL SECTIONS

1. d
2. b
3. a
4. b
5. b
6. c
7. a
8. c
9. a
10. a

File Code: 70.01.02.24.A2-0

Date Published: 8-18-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________

Date: ______________

PERFORMANCE ACTIVITY: Rough Opening Sketching

OBJECTIVES:

Sketch a specified rough opening and label each member.

List the order of assembly for a wall section containing a rough opening.

EVALUATION PROCEDURE:

Sketch clearly represents the given specifications and is clearly labelled.

Order of assembly list is accurate.

RESOURCES:

Carpentry, Carpenters Printing Plant.
Modern Carpentry, Wagner.

PROCEDURE:

1. Read page 124 in Modern Carpentry and Unit III, "Rough Framing" in Carpentry.
2. Obtain specifications for an opening.
3. Sketch the specified wall section.
4. Label each member.
5. List the order of assembly of each member.
6. Have the sketch and list evaluated.

Principal Author(s): R. Arneson

Student: ____________________ File Code: 70.01.02.00.B2-2

Date: ____________________ Date Published: 7/3/1974

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

UNIT POST TEST: FLOOR AND WALL FRAMING

70.01.02.01

1. The floor member that carries the weight from the mud sill to the support girder in a house is called a:

   a. tail joist.
   b. header joist.
   c. floor joist.
   d. girder joist.

2. Which of these statements refers to the floor joist?

   a. It is the member used to provide rough openings.
   b. It boxes the end of structural members.
   c. It is the last outside joist.
   d. It supports floor from mud sill to girder.

3. The joist member that runs along the side of a house and blocks off the other joist to form a box is called a:

   a. balloon.joist.
   b. tail joist.
   c. cripple joist.
   d. header joist.

4. Another name for the header joist is:

   a. box sill.
   b. cripple joist.
   c. balloon joist.
   d. tail joist.

5. When spacing floor joists 16" O.C., what is the first measurement used from the outside edge of the header to the first joist if the joists are considered to be 1½" thick?

   a. 14½"
   b. 16"
   c. 15¼"
   d. 15 3/4"

70.01.02.02

6. What is the minimum distance mud sills should be located from the finished grade?

   a. 20"
   b. 12"
   c. 16"
   d. 8"

70.01.02.02 cont.

7. How are sills placed in relation to the edge of the foundation?

   a. back from the edge the thickness of the sheathing.
   b. back from the edge the thickness of the box sill.
   c. back from the edge the thickness of the headers.
   d. flash.

8. What is the recommended maximum distance between anchor bolts on concrete foundations?

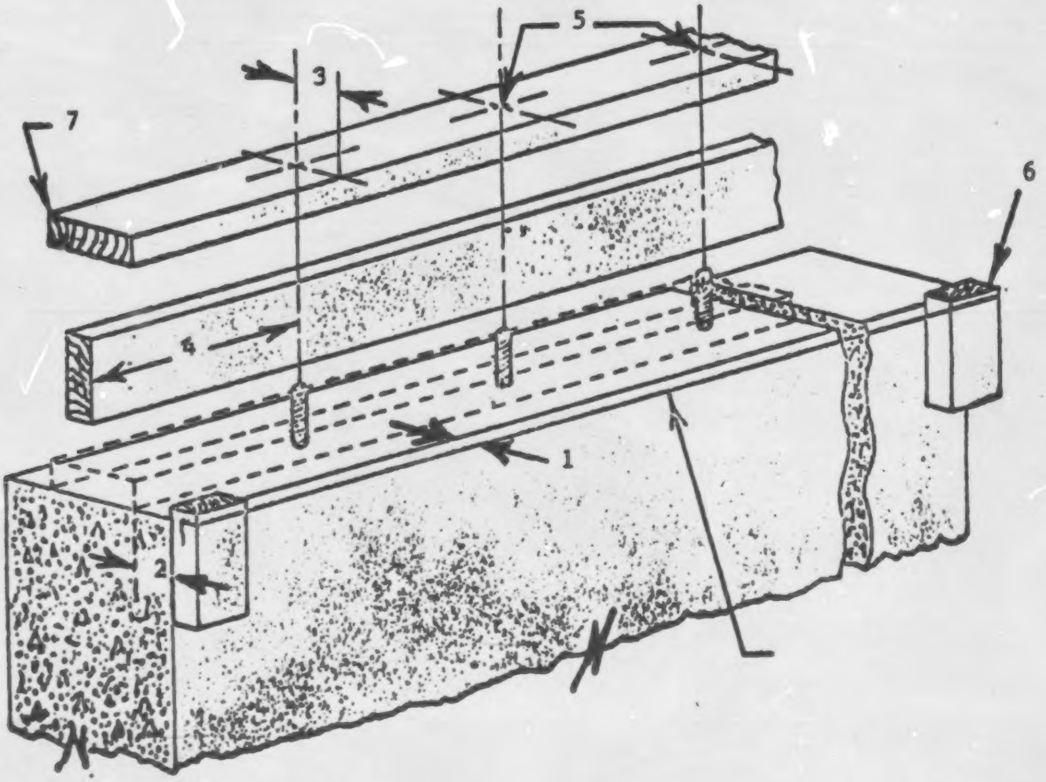
   a. 6'
   b. 8'
   c. 4'
   d. 10'

9. The end of the sill plate is indicated by which number?

   a. 4
   b. 1
   c. 7
   d. 5

10. The distances A and B equal which of the following?

    a. 3
    b. 7
    c. 4
    d. 5



ALIGNING AND DRILLING SILL PLATES

70.01.02.03

11. When laying out floor joists on the box sill, what is the usual first measurement to the first joist from the end of the box sill if joists are considered to be 1½" real dimension and 16" O.C.?

    a. 16"
    b. 15¼"
    c. 15 3/4"
    d. 14½"

12. When laying out the box sill for floor joists, what is the usual first measurement to the first joist from the end of the box sill if joists are considered 2" nominal dimension and joists are on 24" O.C.?

    a. 23 3/4"
    b. 22½"
    c. 23¼"
    d. 24"

13. What is the spacing of the floor joists in the bedrooms? (See plan.)

    a. 16" O.C.
    b. 24" O.C.
    c. 15¼" O.C.
    d. 14½" O.C.

14. How long would the joists have to be in the bedrooms? (See plan.)

    a. 16'
    b. 12'
    c. 14'
    d. 10'

15. What is the length of the floor joist over the living room? (See plan.)

    a. 16'
    b. 14'
    c. 12'
    d. 18'

70.01.02.04 and 70.01.02.05

16. What size girder is used in the living room over the basement? (See plan.)

    a. 8 x 10
    b. 8 x 12
    c. 6 x 10
    d. 8 x 14

17. What type of beam is the girder to the garage area? (See plan.)

    a. steel.
    b. wood built up.
    c. iron.
    d. clear span.

70.01.02.04 and 70.01.02.05

18. What size is the member that supports the girder in the garage? (See plan.)

    a. 6"
    b. 2"
    c. 4"
    d. 8"

19. What supports the girder in the living room at the corner of the porch.

    a. foundation.
    b. pipe column.
    c. beam pocket.
    d. wood post.

20. When figuring girder load, which of the following does it include?

    a. center to center of span.
    b. span from outside wall to outside wall.
    c. span from outside wall to girder.
    d. runs from outside wall to girder.

21. A fire cut joist has which of the following types of cut?

    a. inclined.
    b. square.
    c. plumb.
    d. perpendicular.

22. In the illustration figure 11A, which number would correspond to the ledger board?

    a. 5
    b. 8
    c. 7
    d. 4

23. In the illustration figure 11A, which number would correspond to the ledger supported joist illustration with notch?

    a. 7
    b. 8
    c. 1
    d. 5

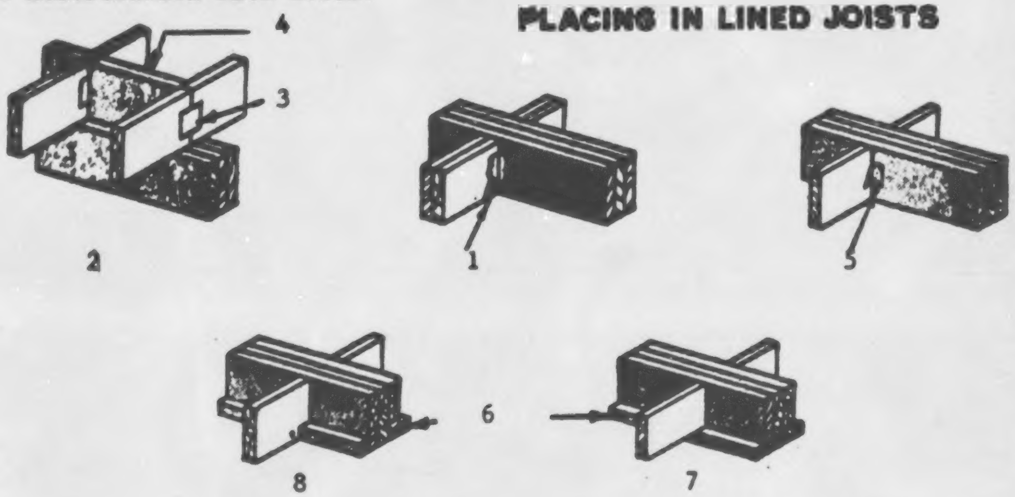
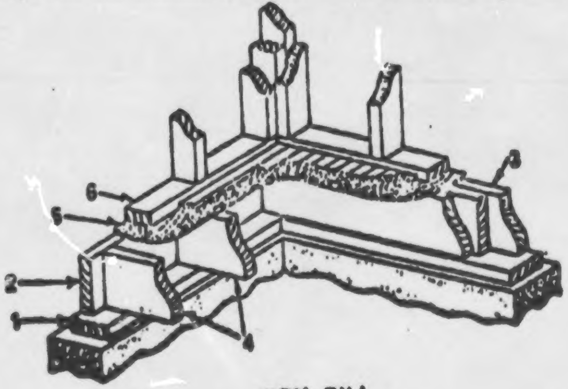

PLACING IN LINED JOISTS

Figure 11A

70.01.02.06

24. In the box sill illustration which number would correspond to the floor joist?

a. 4
b. 3
c. 1
d. 2



BOX SILL

25. In the box sill illustration which number would correspond to the subfloor?

a. 1
b. 5
c. 2
d. 3

70.01.02.07 and 70.01.02.08

26. Bridging is required if joist span is over what distance?

a. 12'
b. 10'
c. 8'
d. 13'

27. What size is solid bridging when it is used in a floor?

a. 2 x 8
b. 2 x 6
c. same size as joist.
d. 2" less than the joist.

28. When are two rows of bridging necessary?

a. if joist span exceeds 12'
b. if joist span exceeds 16'
c. if joist span exceeds 10'
d. if joist span exceeds 8'

29. If joist span exceeds 16', how many rows of bridging would be needed?

a. one.
b. two.
c. three.
d. four.

70.01.02.07 and 70.01.02.08 cont.

30. Wood cross bridging is usually made of which of the following dimensions?

   a. 2 x 10
   b. 2 x 8
   c. 1 x 4
   d. 1 x 12

70.01.02.09

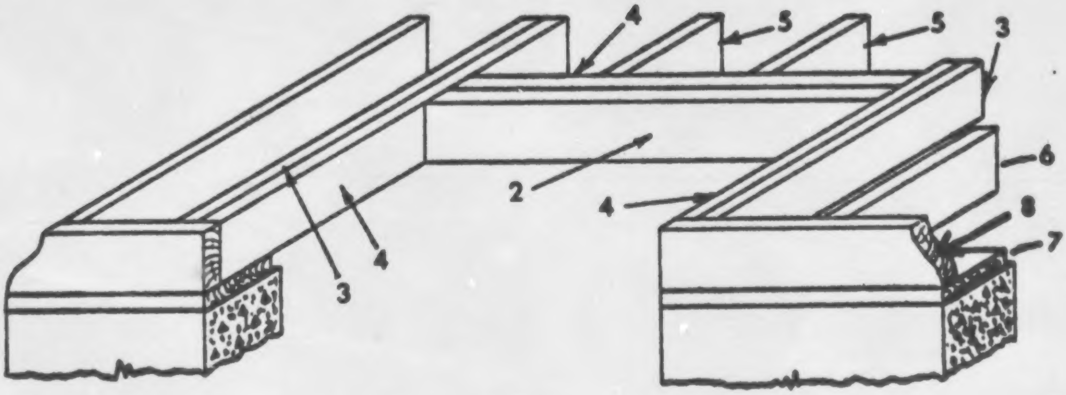


Fig. 23

31. In the illustration figure 23, the member(s) labeled number 2 is (are) called which of the following.

   a. floor joist.
   b. tail joist.
   c. leaders.
   d. rim joist.

32. In the illustration figure 23, the member(s) labeled number 5 is (are) called which of the following?

   a. cripple (tail) joist.
   b. header joist.
   c. rim joist.
   d. box sill.

33. In figure 23 of a stairwell opening, which number would correspond to the third member(s) to be installed when making 2 stairwell?

   a. 4
   b. 5
   c. 1
   d. 2

34. In figure 23 of a stairwell opening, which number would correspond to the fourth member(s) that would be installed by the craftsmen when making 2 stairwell?

   a. 2
   b. 5
   c. 1
   d. 3

70.01.02.09 cont.

35. In figure 23 of a stairwell opening, which number would correspond to the fifth member(s) that would be installed by the craftsman when making 2 stairwell?

a. 3
b. 4
c. 1
d. 2

70.01.02.10 and 70.01.02.11

36. If subfloor boards are run diagonally across the floor, what is the degree of the angle?

a. 90 degree.
b. 45 degree.
c. 35 degree.
d. 75 degree.

37. What size of nail is recommended when installing plywood subfloor?

a. 10d box.
b. 8d box.
c. 6d box.
d. 12d box.

38. If finish floor runs parallel with the floor joist, which way should the subfloor be installed?

a. T & G with the floor joist.
b. with the floor joist.
c. along the floor joist.
d. across the floor joist.

39. Which direction should the surface grain of plywood run in relation to the floor joist.

a. across the floor joist.
b. with the floor joist.
c. diagonally across the floor joist.
d. T & G with the floor joist.

40. In the illustration figure 38, which number would correspond to the sole plate?

a. 4
b. 6
c. 3
d. 7

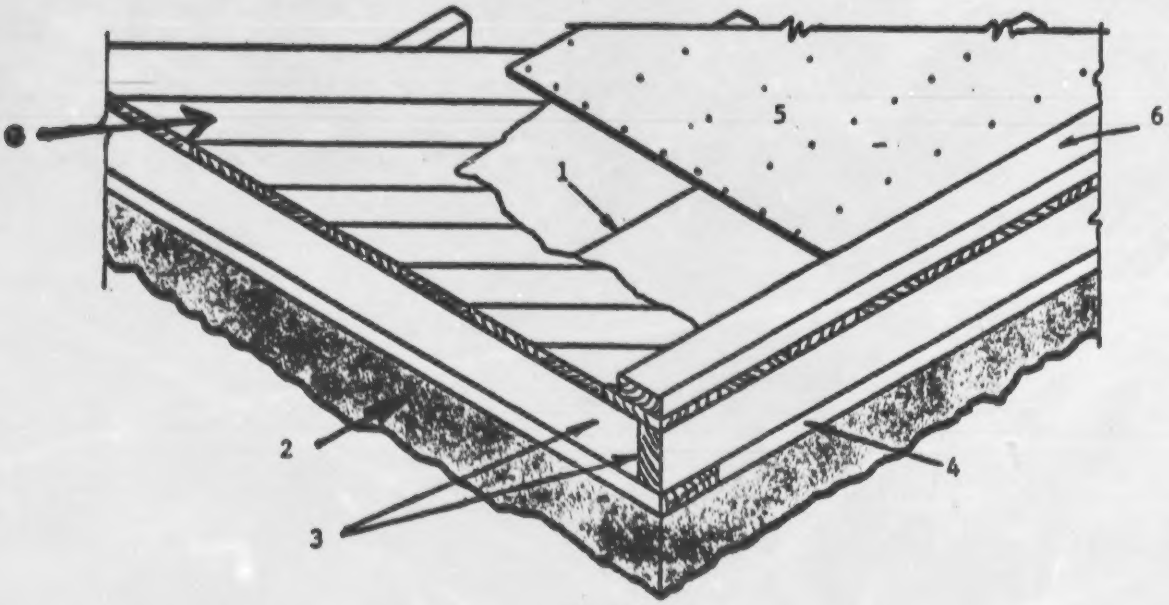


Fig. 88

70.01.02.12

41. How wide is the house? (See plans.)

    a. 44'0"
    b. 23'0"
    c. 34'6"
    d. 9'6"

42. Approximately how many feet of box sill and rim joist will the house require? (See plan.)

    a. 190"
    b. 275'
    c. 150'
    d. 350'

43. Approximately how many floor joists would be needed to carry the floor over the bedrooms and bath area? (See plan.)

    a. 27
    b. 24
    c. 33
    d. 18

44. A quick way to determine how many joists are required for 2 structure is to figure what number of joists per foot if they are on 16" O.C.?

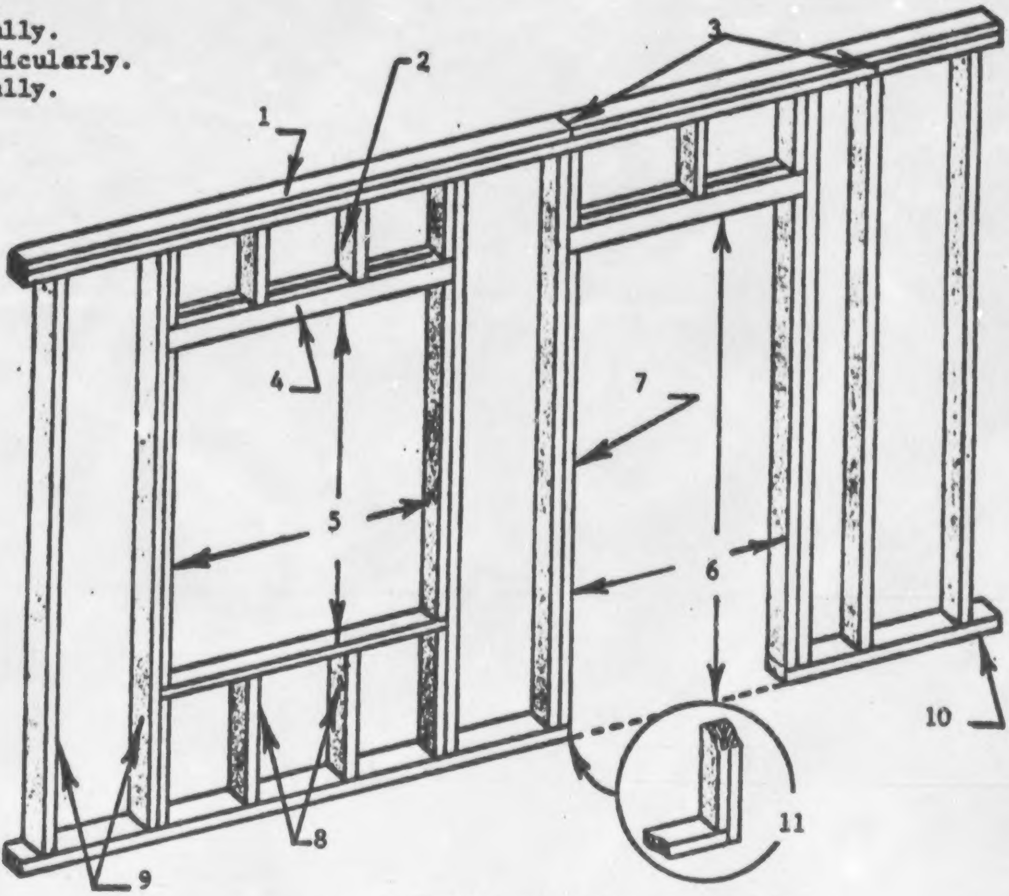
    a. one.
    b. two.
    c. three.
    d. four.

70.01.02.12 cont.

45. How will most of the subfloor be laid in this house? (See specs.)

    a. square.
    b. diagonally.
    c. perpendicularly.
    d. vertically.

70.01.02.13



A TYPICAL WALL FRAME

Fig. 54

46. In figure 54, which number would correspond to the cripple stud?

    a. 2
    b. 9
    c. 10
    d. 1

47. In figure 54, which number would correspond to the alternate door stud arrangement?

    a. 4
    b. 3
    c. 9
    d. 11

70.01.02.13 cont.

48. In figure 54, which number would correspond to the door rough opening?

    a. 6
    b. 5
    c. 4
    d. 11

49. The studs placed over a header are called:

    a. trimmer studs.
    b. cripple studs.
    c. studs.
    d. header studs.

50. The member that spans a rough opening is called a:

    a. double header.
    b. cripple stud.
    c. trimmer stud.
    d. stud.

70.01.02.14

HEADER SPANS

Material on Edge	Supporting one floor, ceiling, roof	Supporting only ceiling and roof
2 x 4	3' - 0"	3' - 6"
2 x 6	5' - 0"	6' - 0"
2 x 8	7' - 0"	8' - 0"
2 x 10	8' - 0"	10' - 0"
2 x 12	9' - 0"	12' - 0"

51. Using the table above, what size header would be required for doors lettered M in the house plan? (See plan.)

    a. 2 x 4
    b. 2 x 6
    c. 2 x 8
    d. 2 x 10

52. Using the table on header spans, what size header would be required for openings labeled letter N in the house? (See plan.)

    a. 2 x 10
    b. 2 x 6
    c. 2 x 8
    d. 2 x 4

70.01.02.14 cont.

53. Using the table on header spans, what size header would be required for openings labeled letter Q in the house? (See plan.)

    a. 2 x 8.
    b. 2 x 6.
    c. 2 x 4.
    d. 2 x 10.

54. Using the table on the header spans, what size headers would be used for the rough opening front bedroom SE elevation? (See plans.)

    a. 2 x 8
    b. 2 x 4
    c. 2 x 6
    d. 2 x 10

55. Using the table on header spans, what size headers would be used for the rough opening in the back bedroom SW elevation? (See Plan)

    a. 2 x 10
    b. 2 x 4
    c. 2 x 8
    d. 2 x 6

70.01.02.15

56. In the plan provided, where on the floor plan are the dimensions measured? (See note on plan.)

    a. from the center to center.
    b. from center of stud.
    c. from the outside edge of studs.
    d. from inside edge of studs.

57. When determining the length of a header, how many member thicknesses must be added to the R. O. size?

    a. four.
    b. one.
    c. three.
    d. two.

58. What is the height to the headers measured from the top of the sole plate in the wall section of the house? (See plan.)

    a. 6'8"
    b. 6'9"
    c. 6'10½"
    d. 6'8½"

70.01.02.15 cont.

59. Allowing 1" to square the window in the rough opening, what length are the headers in front of the kitchen sink (see plan) NE elevation?

a. 3' 2 3/4"
b. 3' 1 3/4"
c. 3' 5 3/4"
d. 3' 4 1/4"

60. Allowing 1" to square the window in the rough opening, what length are the headers in the breakfast area in the house (see plan) NE elevation?

a. 4' 8 1/2 "
b. 4' 10"
c. 4' 7"
d. 4' 6"

70.01.02.1

61. Considering only wood framing, what is the width of the bathroom inside the two partitions NW to SE? (See plan.)

a. 7' 9 1/2
b. 8'0"
c. 8' 3 1/2"
d. 7' 8 1/2"

62. How deep is the bathroom from SW outside wall to the center of the inside wall? (See plan.)

a. 8'0"
b. 10'4"
c. 10'2¼"
d. 10'½"

63. How deep is the bathroom from the outside wall to the inside partition that has a door in it? (See Plan)

a. 8'0"
b. 10'4"
c. 10'½"
d. 10'2¼"

64. What is the width of the passageway between the bedroom inside the two walls considering only the wood? (See plan.)

a. 8'0"
b. 39"
c. 3'7¼"
d. 3'5½"

70.01.02.17 cont.

65. How wide is the living room center to center? (See plan.)

a. 14'10½"
b. 14'7"
c. 14'9"
d. 14'8"

70.01.02.18

66. When considering intersecting partitions, the top plate that runs into the outside wall must be:

a. cut flush with the bottom plate.
b. extended over the bottom plate.
c. cut back from the bottom plate.
d. extended ½ the thickness of the wall.

67. A trussed opening in a wall frame section:

a. distributes the weight to the studs and trimmers.
b. replaces the double header.
c. eliminates a center support in the opening.
d. provides an additional nailing surface.

68. Fire blocking that is installed with one end below and one end above the center line in 2 wall section is called:

a. inline.
b. herringbone.
c. staggered.
d. straight.

69. In figure 64 illustration A depicts which of the following?

a. trimmer.
b. splice.
c. corner.
d. partition.

70. In figure 64 illustration C depicts which of the following?

a. splice.
b. partition.
c. trimmer.
d. corner.

70.01.02,18 cont.

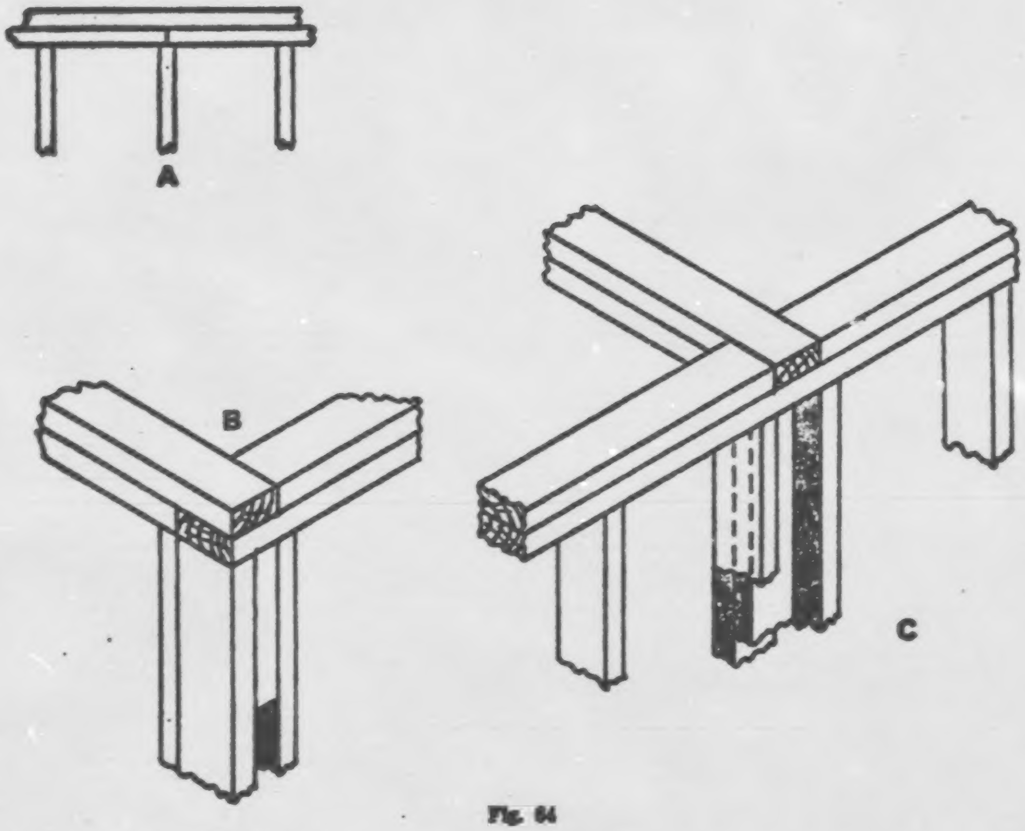


Fig. 64

70.01.02.16 and 70.01.02.19

71. When end nailing stubs from plates, what size nail is usually recommended?

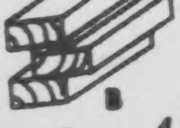
   a. 10d.
   b. 12d
   c. 16d box.
   d. 8d.

72. A member that is supported by trimmers in 2 wall section is a:

   a. cripple.
   b. header.
   c. stud.
   d. sill.

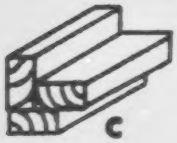
73. A member that has an arrangement like figure B is a :

   a. corner stud.
   b. partition stud.
   c. cripple stud.
   d. trimmer stud.



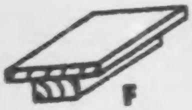
70.01.02.16 and 70.01.02.19 cont.

74. A member that has an arrangement like figure C is called a:



a. partition stud.
b. corner stud.
c. cripple stud.
d. trimmer stud.

75. A member in 2 wall section that has an arrangement like figure F is called a:



a. outside corner stud.
b. partition stud.
c. cripple stud.
d. trimmer stud.

70.01.02.20 70.01.02.21 70.01.02.22

76. Diagonal let-in braces used in exterior walls are:

a. set to brace the wall in both directions.
b. placed at a 60 degree angle.
c. are usually placed after the wall is plumb and in place.
d. set on the inside surface of the stud wall.

77. Diagonal wall bracing for exterior walls is generally laid at an agle of:

a. 30 degrees.
b. 60 degrees.
c. 45 degrees.
d. 90 degrees.

78. Where is the sole plate located in a horizontal wall section and in what position is it placed?

a. horizontally at the bottom.
b. horizontally at the top.
c. vertically at the bottom.
d. vertically at the top.

79. When using a plumb bob to level a wall section which of the following tools must be used?

a. combination square.
b. level.
c. square.
d. spacer block.

80. How many studs would be in a section of wall 8'0" long?

a. 7
b. 8
c. 6
d. 5

70.01.02.23

81. If the window sill plates are double in the SE wall section, how many linear feet of plate will be needed for the window sills in the SE wall section? (See plan.)

   a. 15'
   b. 30'
   c. 17'
   d. 24'

82. Approximately how many L/F (linear feet) of plate will be needed for the bottom sole plate of the SE wall section of the house? (See Plan)

   a. 75'
   b. 35'
   c. 105'
   d. 70'

83. How many tough openings are there on the NE elevation of the front wall of the bedroom? (See plan.)

   a. three.
   b. two.
   c. one.
   d. four.

84. How many partition assemblies will be required for the front wall of the bedroom NE elevation? (See plan.)

   a. three.
   b. two.
   c. one.
   d. four.

85. How many linear feet (L/F) of plate will be needed for plates on the front wall of the bedroom NE elevation? (See Plan)

   a. 54'
   b. 40'
   c. 36'
   d. 18'

UNIT POST TEST ANSWER KEY: FLOOR AND WALL FRAMING

70.01.02.01

1. C
2. D
3. D
4. A
5. C

70.01.02.02

6. D
7. A
8. B
9. C
10. A

70.01.02.03

11. B
12. C
13. A
14. C
15. A

70.01.02.04
&
70.01.02.05

16. A
17. B
18. C
19. B
20. A

70.01.02.06

21. A
22. D
23. B
24. A
25. B

70.01.02.07
&
70.01.02.08

26. C
27. C
28. B
29. B
30. C

70.01.02.09

31. C
32. A
33. B
34. A
35. A

70.01.02.10
&
70.01.02.11

36. B
37. B
38. D
39. A
40. B

70.01.02.12

41. A
42. A
43. C
44. A
45. B

70.01.02.13

46. D
47. D
48. A
49. B
50. A

70.01.02.14

51. A
52. D
53. C
54. C
55. D

70.01.02.15

56. C
57. D
58. B
59. C
60. B

70.01.02.17

61. D
62. B
63. D
64. D
65. A

70.01.02.18

66. B
67. A
68. B
69. B
70. D

70.01.02.16
&
70.01.02.19

71 C
72. B
73. A
74. B
75. B

70.01.02.20
70.01.02.21
70.01.02.22

76. C
77. C
78. A
79. D
80. A

70.01.02.23

81. B
82. B
83. C
84. C
85. A

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Student: ____________________ **File Code:** 70.01.02.00.A1-5

Date: ____________________ **Date Published:** 11-13-74

Family Pay Number: __________ Sex: M F (Circle 1)

UNIT PERFORMANCE TEST: FLOOR AND WALL FRAMING

OBJECTIVE:

Given a set of specifications the student will be able to layout plates for a wall section.

TASK:

Layout plates for a wall section. Include windows and door openings, stud height, sills, headers, cripples and trimmers.

ASSIGNMENT:

CONDITIONS:

All necessary tools, equipment and supplies will be provided. Instructor will provide blueprint specifications. No assistance will be provided by other students.

RESOURCES:

(See attached sheet)

RESOURCES:

Claw hammer
Tape measure
Framing Square
Chalk and plumb line
Level
"T" bevel square
Flat rip bar
Brace and bit set
Power hand saw
Drill
Circular saw
Radial saw
Assortment of fastners and lumber

Student: ____________________ File Code: 70.01.02.00.A1-5

Date: ____________________ Date Published: 11-13-74

Family Pay Number: __________ Sex: M F (Circle 1)

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

PERFORMANCE CHECKLIST:

OVERALL PERFORMANCE: Satisfactory_____ Unsatisfactory_____

	CRITERION	
	Met	Not Met
Objective 1:		
1. Meets specified dimensions.		
Criterion: Measurements meet specifications, ± 1/16".		
2. Uses proper materials.		
Criterion: Materials meet FHA standards and specifications.		
3. Uses tools and equipment safely.		
Criterion: No injuries or damage to equipment occur.		
4. Student completes job in the allotted time.		
Criterion: As specified.		
To obtain an **overall score** of satisfactory, student must		
meet criterion **on 3/4 line** items.		

File Code: 70.01.03.00.A2-1

Date Published: August 18, 1975

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Experience Guide

UNIT: CEILING FRAMING

RATIONALE:

A carpenter performs the framing of ceiling for a structure. Developing the skills and acquiring knowledge needed to do a quality ceiling support job for a structure is the intent of the activities in this unit. To adequately assemble and install the ceiling sections for a structure validates you for this part of rough-in skills necessary for a qualified carpenter.

PREREQUISITES:

The course prerequisites listed in the course guide are required for this unit.

OBJECTIVES:

Given tools, equipment, materials and construction specifications, you will:

Sketch the support components for ceiling sections.

Determine material requirements for ceiling framing jobs.

Lay out the location of the ceiling framing components.

Prepare, assemble and install the ceiling framing components.

RESOURCES:

Printed Materials

Blueprint Reading and Sketching, Carpentry Trades, Residential. Delmar Publishers, 1957.
Carpentry. United Brotherhood of Carpenters and Joiners of America, Carpenters Printing Plant, Washington, D.C., 1950-1970.
Modern Carpentry. Willis H. Wagner, The Goodheart-Willcox Company, Inc., 1973.

Principal Author(s): Lyle Leland

Equipment

Drill, electric hand.
Hammer, claw. (16 oz. and 20 oz.)
Knife, utility.
Ladder, step (6 ft.)
Level, spirit. (24")
Line, chalk.
Plane, block. (power)
Ruler
Saw, power hand. (6 1/2" blade)
Saw, radial arm.
Saw, saber
Screwdriver, phillips set.
Screwdriver, slot set.
Square, combination.
Square, framing.
Square, T-Level.
Stapler, hammer type.
Tape Measure (12 ft.)

GENERAL INSTRUCTIONS:

This unit consists of seven Learning Activity Packages (LAPS). Each LAP will provide specific information for completion of a learning activity.

The general procedure for this unit is as follows:

(1) Read the first assigned Learning Activity Package (LAP).
(2) Begin and complete the first assigned LAP.
(3) Take and score the LAP test.
(4) Turn in the LAP test answer sheet.
(5) Determine the reason for any missed items on the LAP test.
(6) Proceed to and complete the next assigned LAP in the unit.
(7) Complete all required LAPs for the unit by following steps 3 through 6.
(8) Take the unit tests as described in the Unit LEG "Evaluation Procedures."
(9) Proceed to the next assigned unit.

PERFORMANCE ACTIVITIES:

.01 Bill of Materials
.02 Ceiling Joist Layout
.03 Ceiling Joist Installation
.04 Interior and Exterior Backing
.05 Access Openings
.06 Method of Building a Support Beam
.07 Strongback Sketching

EVALUATION PROCEDURE:

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.
3. The student then takes a unit performance test if the unit pretest was successfully completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes a multiple-choice unit post test and a unit performance test.
2. Successful unit completion is meeting the listed criteria for the performance test.

FOLLOW-THROUGH:

After reading this unit guide, obtain the LAP for the first assigned performance activity. Read the LAP. Carefully follow the steps given in the procedures section. Use the knowledge and skills you have acquired in performing each activity in this unit.

Student: ______________________ File Code: 70.01.03.00. A2-2

Date: ______________________ Date Published: 6/11/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

UNIT PRETEST: CEILING FRAMING

70.01.03.01.

1. How many ceiling joists are required to complete the ceiling over the bathroom's second bath area? (See Plan)

   a. 12
   b. 13
   c. 14
   d. 11

2. What size should the on center spacing be for the ceiling joists in the living room: (See Plan)

   a. 16" O.C.
   b. 12" O.C.
   c. 24" O.C.
   d. 18" O.C.

3. How many board feet are in two 2"x10"x16' boards:

   a. 24.3 bd/ft
   b. 26.6 bod/ft
   c. 19.8 bd/ft
   d. 17.5 bd/ft

4. How many board feet are in two 2"x10"x8' boards:

   a. 8 bd/ft
   b. 13.3 bd/ft
   c. 12 bd/ft
   d. 6 bd/ft

5. How many board feet are in one 2"x10"x14' beard:

   a. 22.6 bd/ft
   b. 12 bd/ft
   c. 13.4 bd/ft
   d. 16.5 bd/ft

6. The members of a wall section that make it nonessential to install ceiling joists directly over studs are called:

   a. trimmers.
   b. double plates.
   c. cripples.
   d. sole plates.

7. Refer to the accompanying Plan. The ceiling joists for this residence are positioned:

   a. 12" O.C.
   b. 24" O.C.
   c. 18" O.C.
   d. 16" O.C.

The following four questions refer to Figure I provided below.

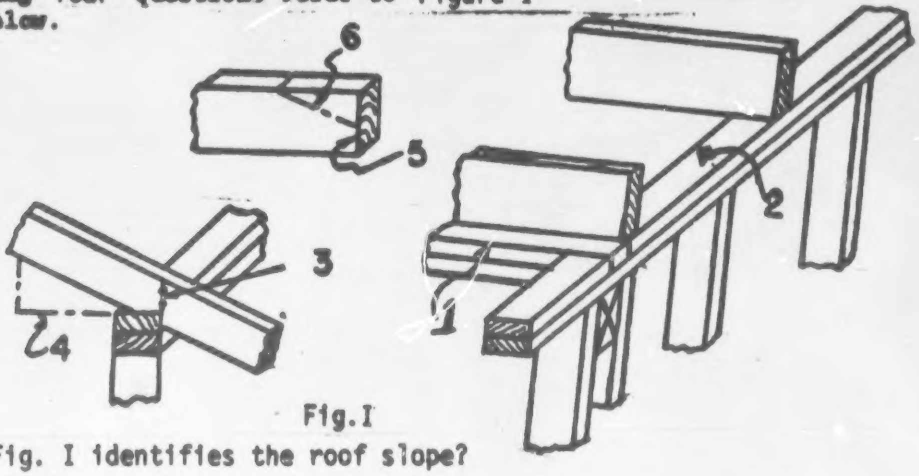


Fig.I

8. Which number in Fig. I identifies the roof slope?

   a. 2.
   b. 1.
   c. 4.
   d. 3.

9. Which number in Fig. I identifies the typical slope cut of the tailed ceiling joists?

   a. 4.
   b. 3.
   c. 6.
   d. 2.

70.01.03.02.

10. Which number in Fig. I refers to a ceiling layout that requires no backing over partitions?

a. 2.
b. 1.
c. 4.
d. 3.

70.01.03.03

11. In Fig. I, which number identifies a double top plate assembly?

a. 5.
b. 4.
c. 2.
d. 1.

12. In Fig. II the ceiling joists are turned at 90 degrees from each other in order to:

a. span the longest length.
b. span the shortest length.
c. provide easy access.
d. distribute the load over the longest span.

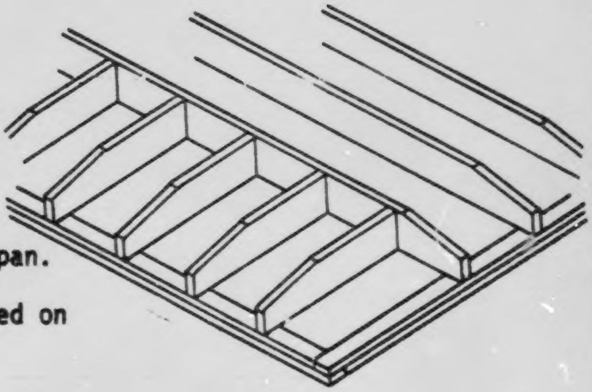


Fig. II

13. Which of the following is generally required on a hip roof that has a low slope?

a. herringbone installation.
b. bridging.
c. stub ceiling joists.
d. wainscot installation.

14. In Fig. III, which number indicates the unit run when tailing a ceiling joist?

a. 2.
b. 1.
c. 3.
d. 4.

15. In Fig. III, which number indicates the unit rise when tailing a ceiling joist?

a. 1.
b. 3.
c. 4.
d. 2.

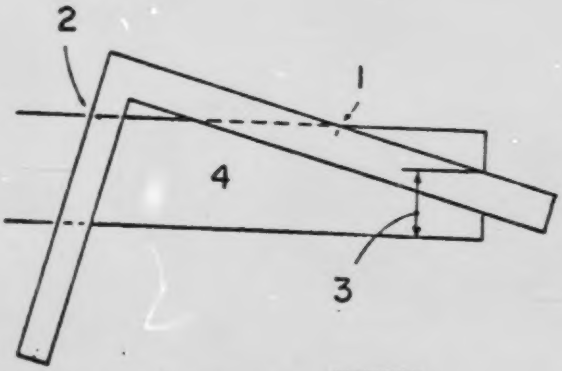


Fig. III

16. The member that provides the nailing surface for a residential ceiling covering is called:

    a. cripples.
    b. headers.
    c. trimmers.
    d. backing.

17. How are backing members positioned on partitions that run parallel with ceiling joists:

    a. on edge, horizontal
    b. on edge, vertical
    c. flat, horizontal
    d. flat, vertical

18. If a 2"x4" wide partition is running parallel with the ceiling joists, what is the minimum sized backing member that should be used:

    a. 2"x8"
    b. 2"x6"
    c. 2"x4"
    d. 2"x10"

19. Which of the following members are required when partitions run with the ceiling joists that are installed over wall studs:

    a. backing.
    b. headers.
    c. trimmers.
    d. cripples.

20. Members nailed to the top of partition top plates running with or parallel to the ceiling joists are called:

    a. headers.
    b. bridging.
    c. backing.
    d. trimmers.

21. Joist hangers can be substituted for which of the following:

    a. bolts.
    b. framing anchors.
    c. screws.
    d. lag bolts.

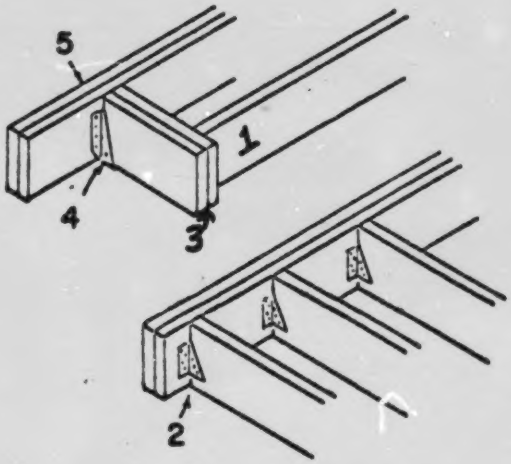


Fig. IV

22. In Fig. IV, which number identifies a ceiling tail joist?

    a. 3.
    b. 5.
    c. 1.
    d. 2.

23. In Fig. IV, which of the following numbers corresponds to a framing anchor that is commonly used in ceiling access openings?

    a. 5.
    b. 4.
    c. 1.
    d. 2.

24. In Fig. IV, which number identifies a typical double header used in an access opening?

    a. 3.
    b. 1.
    c. 2.
    d. 4.

25. Which of the following is very similar to constructing an access opening in a ceiling:

   a. a stairwell rough opening.
   b. a window rough opening.
   c. a door rough opening.
   d. plumbing rough opening.

70.01.03.06.

26. A support beam is used as a:

   a. flooring brace.
   b. rafter support.
   c. ceiling joist support.
   d. bearing partition support.

27. A support beam is positioned:

   a. below the ceiling joists.
   b. above the rafters.
   c. flush with the ceiling joists.
   d. even with the rafters.

28. The ceiling joists are positioned:

   a. above the rafters.
   b. flush with the support beam.
   c. below the support beam.
   d. even with the rafters.

29. A support beam should be installed:

   a. at the same time the ceiling joists are put up.
   b. before the ceiling joists are installed.
   c. at the same time the roof is being put up.
   d. after the ceiling joists are installed.

30. In Fig. V, item "A" is a:

a. strongback.
b. spacer block.
c. ceiling joist.
d. support beam.

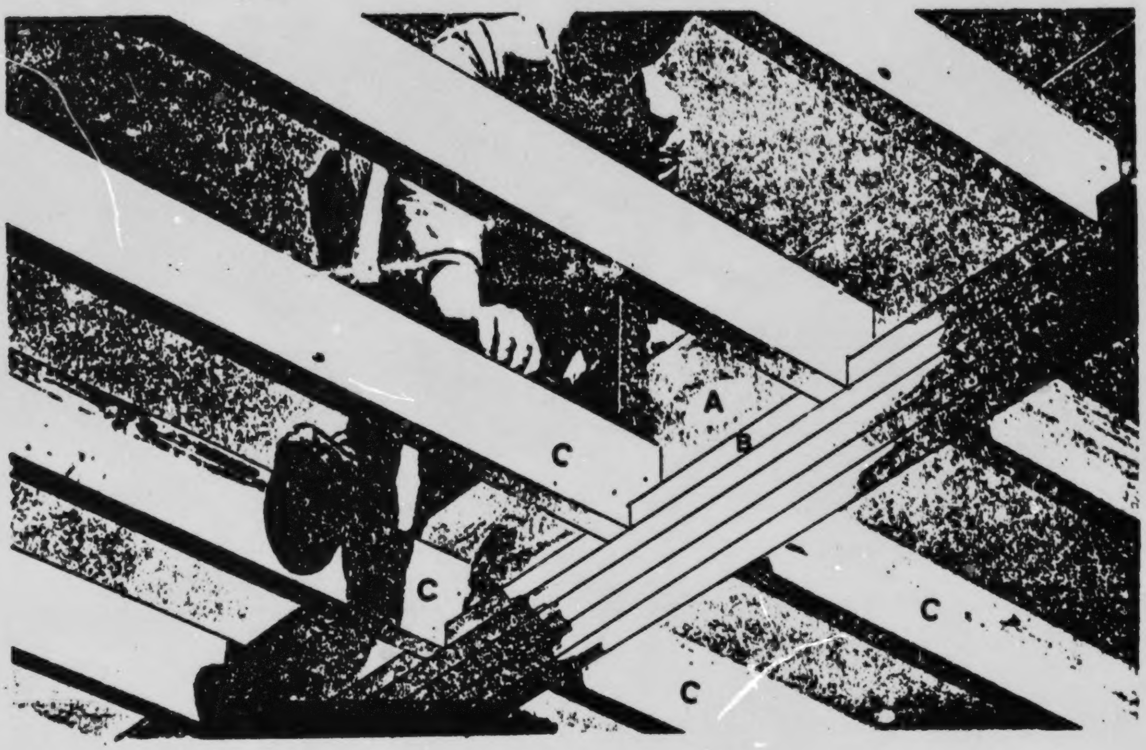


Fig. V

70.01.03.07.

31. When installing a strongback, stay lath is used to:

    a. align ceiling joists.
    b. support bearing partitions.
    c. brace rafters.
    d. prevent slippage of spacer blocks.

32. Item "B" in Fig. VI is used to:

    a. provide support for the strongback.
    b. provide alignment for the strongback.
    c. provide support for the ceiling joists.
    d. keep the two (2) boards that make up the strongback together.

33. Item "D" in Fig. VI is:

    a. a ceiling joist.
    b. a strongback.
    c. a bearing partition.
    d. a cripple stud.

34. In Fig. VI, items "E" are:

    a. bearing partitions.
    b. ceiling joists.
    c. cripple studs.
    d. rafters.

35. The strongback is positioned on the centerline to:

    a. align the spacer blocks.
    b. strengthen the bearing partitions.
    c. provide uniform support for the ceiling joists.
    d. provide support for the cripple studs.

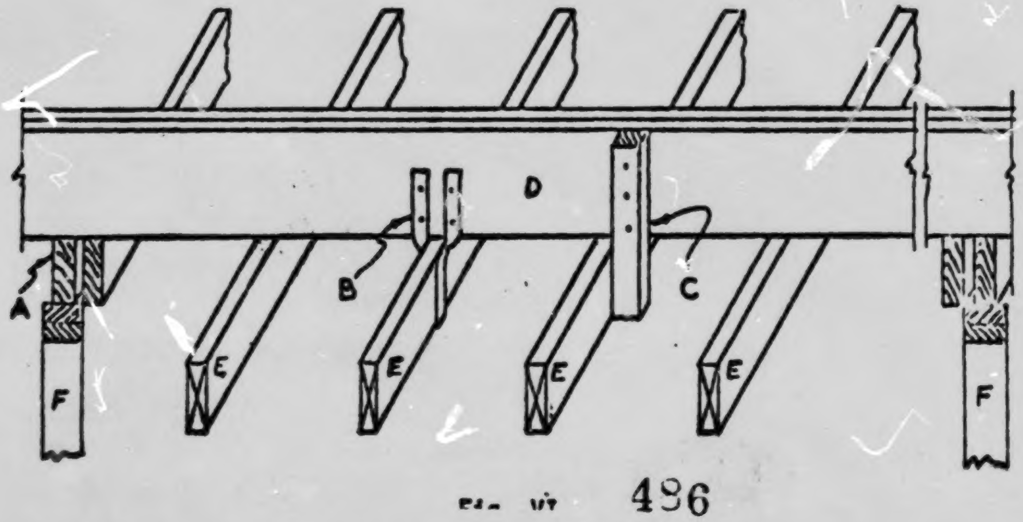


Fig. VI

UNIT PRETEST answer key: CEILING FRAMING

LAP	
01	1. C
	2. A
	3. B
	4. B
	5. A
02	6. B
	7. D
	8. C
	9. C
	10. A
03	11. C
	12. B
	13. C
	14. B
	15. D
04	16. D
	17. C
	18. B
	19. A
	20. C
05	21. B
	22. C
	23. D
	24. A
	25. A
06	26. C
	27. C
	28. B
	29. A
	30. D
07	31. A
	32. C
	33. B
	34. B
	35. C

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.03.01.A2-0

Date Published: 8/19/75

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Bill of Materials

OBJECTIVES:

Estimate and list, as if for order, the materials needed for a specified ceiling section.

EVALUATION PROCEDURE:

The list of materials meet the criteria outlined in the resource on ordering.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.
Carpentry, Carpenters Printing Plant.

PROCEDURE:

1. Read pages 154-155 in *Modern Carpentry* and "Rough Framing," Unit III in *Carpentry*.
2. Obtain specifications for a ceiling section.
3. List the tools, supplies and materials needed to complete this job.
4. Hand in the necessary completed bill of materials for evaluation.
5. Take the LAP test.

Principal Author(s): R. Arneson
T. Frisbee

Student: ______________________ File Code: 70.01.03.01. A2-2

Date: ______________________ Date Published: 6/12/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: BILL OF MATERIALS

1. What size are the joists over the dining room area? (See plan)

   a. 2"x6"
   b. 2"x10"
   c. 2"x8"
   d. 2"x12"

2. By using the accompanying Plan sheet, determine the size of ceiling joists required in the bedroom bath area of the house. (See plan)

   a. 2"x8"
   b. 2"x6"
   c. 2"x10"
   d. 2"x12"

3. How many ceiling joists are required to complete the ceiling over the bathroom's second bath area? (See Plan)

   a. 12.
   b. 13.
   c. 14.
   d. 11.

4. What size should the on center spacing be for the ceiling joists in the bedroom/bath area of the house? (See Plan)

   a. 24" O.C.
   b. 12" O.C.
   c. 16" O.C.
   d. 32" O.C.

5. What length of ceiling joists is required for the back bedroom? (See Plan)

   a. 16'.
   b. 12'.
   c. 14'.
   d. 10'.

6. What size should the on center spacing be for the ceiling joists in the living room? (See Plan)

   a. 16" O.C.
   b. 12" O.C.
   c. 24" O.C.
   d. 18" O.C.

7. In which direction do the ceiling joists run? (See Plan)

   a. with the length
   b. across the width
   c. from exterior wall to exterior wall
   d. from beam to exterior wall

8. How many board feet are in two 2"x10"x16' boards?

   a. 24.3 bd/ft
   b. 26.6 bd/ft
   c. 19.8 bd/ft
   d. 17.5 bd/ft

9. How many ceiling joists would be required in the bedroom/passage way area? (See plan)

   a. 14.
   b. 16.
   c. 15.
   d. 13.

10. What length would the joists for the bathroom/passage way have to be? (See Plan)

    a. 10'
    b. 14'
    c. 12'
    d. 8'

LAP TEST answer key: BILL OF MATERIALS

1. B
2. C
3. C
4. C
5. C
6. A
7. B
8. B
9. A
10. D

File Code: 70.01.03.02.A2-0

Date Published: 8/19/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Ceiling Joist Layout

OBJECTIVES:

Lay out and cut out a ceiling joist given specifications following procedures accepted in the industry.

EVALUATION PROCEDURE:

Ceiling joist meet the criteria listed on the checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.
Carpentry, Carpenters Printing Plant
Measuring tape (12 ft.)
Combination Square
Power hand saw (6 1/2" blade)

PROCEDURE:

1. Read pages 152-153 in Modern Carpentry and pages 95-100, Unit III in Carpentry.
2. Obtain specifications for a ceiling joist.
3. Obtain the tools, supplies and materials needed to complete this job.
4. Complete the job and have it evaluated. (The instructor may have this scaled down).
5. Clean up the area and put the tools and supplies away.
6. Take the LAP test.

Principal Author(s): R. Arneson
T. Frisbee

CHECKLIST: Ceiling Joist

_______ Accurate layout to ± 1/16".

_______ Followed accepted procedures.

_______ Square markings are and will be visible after joist installation.

Student: ______________________ File Code: 70.01.03.02. A2-2

Date: ______________________ Date Published: 6/12/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: CEILING JOIST LAYOUT

1. Ceiling joists are usually installed in such a manner as to span:

   a. from corner to corner.
   b. the longest distance.
   c. from the outside wall to the outside wall.
   d. the shortest distance.

2. Which of the following factors affects the positioning of ceiling joists?

   a. whether or not fire blocking is used.
   b. the position of the studs.
   c. the position of trimmers.
   d. whether or not backing is placed on walls.

3. Which of the following on center spacing dimension is not commonly used in ceiling frame construction?

   a. 12" O.C.
   b. 18" O.C.
   c. 16" O.C.
   d. 24" O.C.

4. Which of the following items must be used if a flush beam is to be installed in a ceiling assembly?

   a. inlet brace.
   b. ribbon.
   c. joist hangers.
   d. ceiling jack.

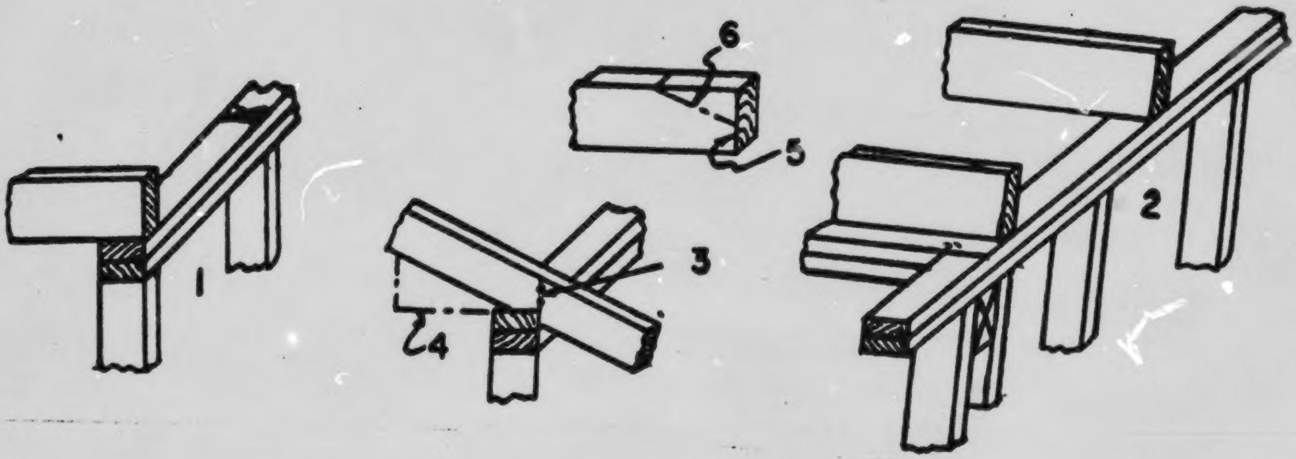
5. Cutting the lower end of a rafter or overhang is called a:

   a. lintel cut.
   b. header cut.
   c. tail cut.
   d. purlin.

6. Refer to the accompanying Plan. The ceiling joists for this residence are positioned:

   a. 12" O.C.
   b. 24" O.C.
   c. 18" O.C.
   d. 16" O.C.

The following five questions refer to the illustration provided below.



7. Which number identifies the roof slope?

   a. 2.
   b. 1.
   c. 4.
   d. 3.

8. Which number identifies the typical slope cut of the tailed ceiling joists?

   a. 4.
   b. 3.
   c. 6.
   d. 2.

9. Which number refers to a ceiling layout that requires no backing over parallel partitions?

   a. 2.
   b. 1.
   c. 4.
   d. 3.

10. Which number refers to the height left above the plate on a ceiling joist?

    a. 6.
    b. 4.
    c. 3.
    d. 1.

LAP TEST answer key: **CEILING JOIST LAYOUT**

1. D
2. D
3. B
4. C
5. C
6. D
7. C
8. C
9. A
10. C

File Code: 70.01.03.03.A2-0

Date Published: 8/19/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Ceiling Joist Installation

OBJECTIVE:

Install ceiling joist according to specifications. Follow procedures accepted in the industry.

EVALUATION PROCEDURE:

Installation meets the criteria listed on the checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.
Carpentry, Carpenters Printing Plant.
claw hammer (20 oz.)

PROCEDURE:

1. Read pages 152-153 in Modern Carpentry and "Rough Framing," Unit III in Carpentry.
2. Obtain ceiling joist installation specifications.
3. Obtain the tools, supplies and materials needed to complete this job.
4. Complete the job and have it evaluated.
5. Clean up the area and put the tools and supplies away.
6. Take the LAP test.

Principal Author(s): R. Arneson
T. Frisbee

CHECKLIST: Ceiling Joist Installation

_______ Fastened properly.

_______ Neat.

_______ Square.

_______ Measurements are accurate to ± 1/8".

_______ Procedures used are accepted in the industry.

_______ Meets specifications.

Student: ______________________ File Code: 70.01.03.03. A2.2

Date: ______________________ Date Published: 6/12/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: CEILING JOIST INSTALLATION

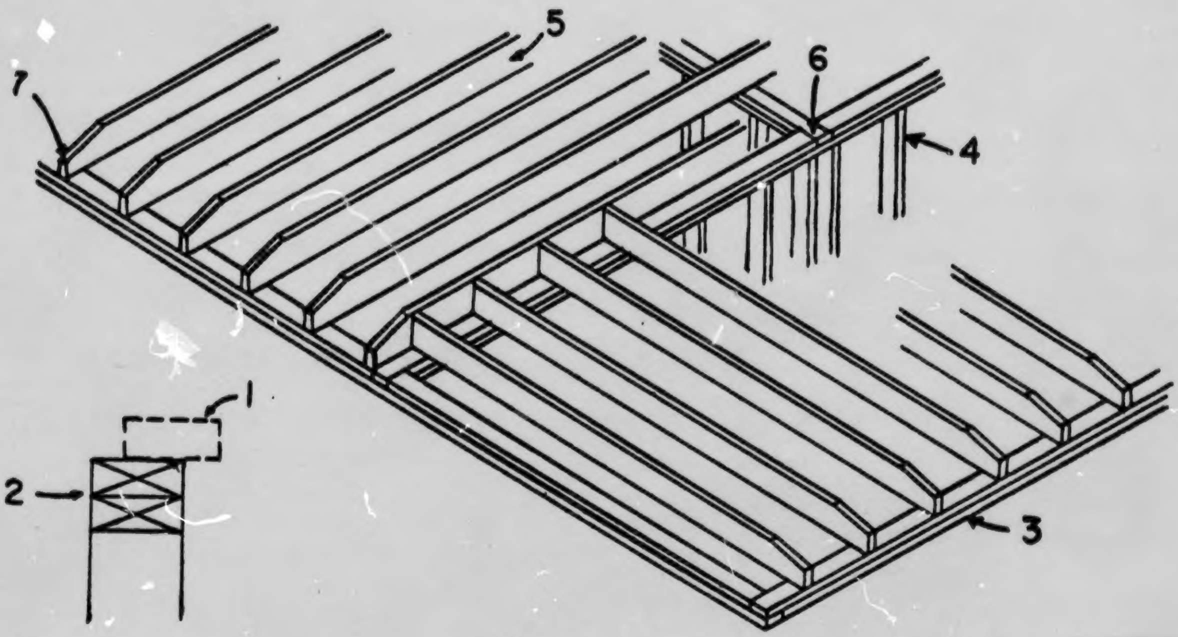


Fig. 1

1. In figure #1, which number would identify the symbols of a top plate wall assembly?

   a. 4.
   b. 2.
   c. 5.
   d. 6.

2. In figure #1, which number identifies the end view of a ceiling backing?

   a. 2.
   b. 1.
   c. 3.
   d. 4.

3. In figure #1, the number which corresponds to the illustration of an intersecting partition is:

   a. 6.
   b. 2.
   c. 3.
   d. 4.

4. The number which identifies a load bearing partition in figure #1 is:

   a. 3.
   b. 5.
   c. 4.
   d. 1.

5. Which number **identifies** a ceiling joist in figure #1?

   a. 4.
   b. 6.
   c. 5.
   d. 3.

6. In figure #1, the ceiling joists are turned at 90 degrees from each other in order to:

   a. span the longest length.
   b. span the shortest length.
   c. provide easy access.
   d. distribute the load over the longest span.

7. In figure #1, which number corresponds to the tail cut of a typical ceiling joist?

   a. 3.
   b. 1.
   c. 2.
   d. 7.

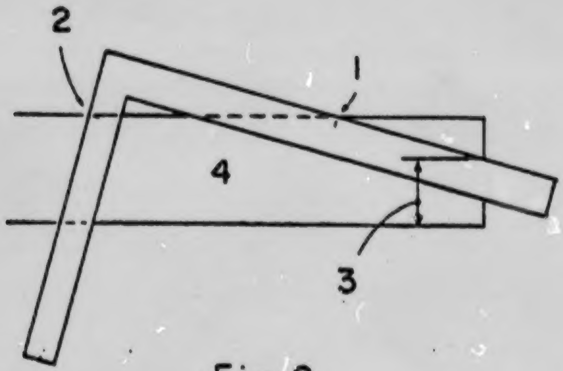


Fig. 2

8. In figure #2, which number corresponds to the unit rise when tailing a ceiling joist?

   a. 1.
   b. 3.
   c. 4.
   d. 2.

9. Which number corresponds to the ceiling joist in figure #2?

   a. 4.
   b. 3.
   c. 2.
   d. 1.

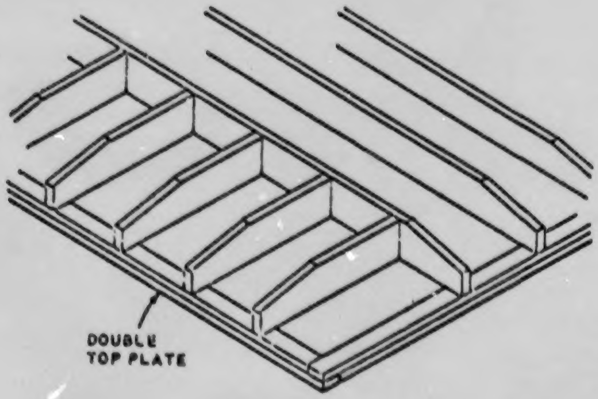


Fig. 3

10. Which of the following installations is illustrated by figure #3?

    a. cornice ceiling joist.
    b. herringbone ceiling joist.
    c. waynes coat ceiling joist.
    d. stub ceiling joist.

LAP TEST answer key: CEILING JOIST INSTALLATION

1. B
2. B
3. A
4. C
5. C
6. C
7. D
8. D
9. A
10. D

File Code: 70.01.03.04.A2-0

Date Published: 8/19/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Interior and Exterior Backing

OBJECTIVES:

Install backing according to specifications. Follow accepted procedures in the industry.

Identify purpose of backing.

EVALUATION PROCEDURE:

Installation meets the criteria on the attached check list.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.
Carpentry, Carpenters Printing Plant.
Measuring tape (12 ft.)
Combination square
Power hand saw (6 1/2" blade)

PROCEDURE:

1. **Read pages 152-155 in Modern Carpentry and pages 95-96, Unit III in Carpentry.**
2. Obtain installation specifications.
3. Obtain the tools, supplies and materials needed to complete this job.
4. Complete the job and have it evaluated.
5. Clean up the area and put the tools and supplies away.
6. **Take the LAP test.**

Principal Author(s): R. Arneson
T. Frisbee

CHECKLIST: Install Backing

______ Fastened properly.

______ Neat.

______ Square.

______ Measurements are accurate to ± 1/8".

______ Procedures are accepted in the industry.

______ Meets specifications.

Student: ______________________________ File Code: 70.01.03.02. A2-2

Date: ______________________________ Date Published: 6/12/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: INTERIOR AND EXTERIOR BACKING

1. Ceiling backing is used for which of the following purposes?

    a. to provide fire resistance.
    b. to brace the top portions of partitions.
    c. to provide a nailing surface for ceiling coverings.
    d. to provide a nailing surface for insulation.

2. If a 2"x6" wide partition is running with the ceiling joists, what is the minimum size backing member that should be used?

    a. 2"x4".
    b. 2"x8".
    c. 2"x6".
    d. 2"x10".

3. Which of the following best describes the position of backing members in relation to ceiling joists?

    a. the bottom of the backing is above the bottom of the ceiling joists.
    b. the bottoms of both members are level with each other.
    c. the bottom of the backing is below the bottom of the ceiling joists.
    d. the bottom of the backing is flush with the top of the ceiling joists.

4. What is the minimum length that backing should overlap the edges of a partition?

    a. 3/8"
    b. 1/8"
    c. 1/4"
    d. 3/4"

5. How are backing members positioned on partitions that run parallel with ceiling joists?

    a. on edge, horizontal.
    b. on edge, vertical.
    c. flat, horizontal.
    d. flat, vertical.

6. When installing backing on partitions that run with the ceiling joists, the backing should:

   a. overlap the partition on one side.
   b. overlap the partition on both sides.
   c. not overlap the partition.
   d. be flush with one side of the partition.

7. If a 2"x4" wide partition is running parallel with the ceiling joists, what is the minimum sized backing that should be used?

   a. 2"x8"
   b. 2"x6"
   c. 2"x4"
   d. 2"x10"

8. Which of the following members are required when partitions run with the ceiling joists that are installed over wall studs?

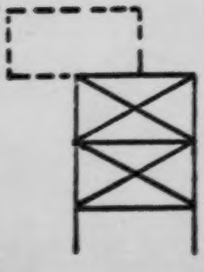
   a. backing.
   b. headers.
   c. trimmers.
   d. cripples.

9. Members nailed to the top of partition top plates running with or parallel to the ceiling joists are called:

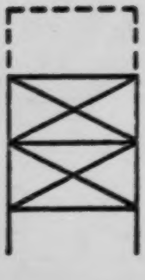
   a. headers.
   b. bridging.
   c. backing.
   d. trimmers.

10. Which of the following is a typical illustration of backing on an exterior partition?

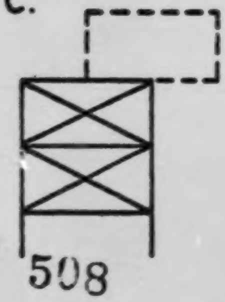
A.



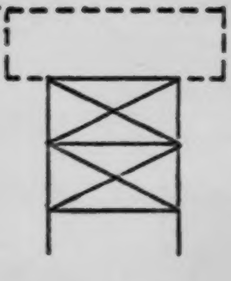
B.



C.



D.



LAP TEST answer key: INTERIOR AND EXTERIOR BACKING

1. C
2. B
3. B
4. D
5. C
6. B
7. B
8. A
9. C
10. A

File Code: 70.01.03.05.A2-0

Date Published: 8/19/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student:

Date:

PERFORMANCE ACTIVITY: Access Openings

OBJECTIVES:

Construct an access opening in the ceiling according to specifications. Follow procedures accepted in the industry.

Identify components of access opening.

EVALUATION PROCEDURE:

Construction meets the criteria on the attached check list.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.
Carpentry, Carpenters Printing Plant.
Step ladder
Measuring tape (12 ft.)
Spirit level (24")
Framing square
Combination Square
T-bevel square
Claw hammer (16 oz.)
Saber power saw
Power hand saw (6 1/2" blade)

PROCEDURE:

1. Read page 124 in Modern Carpentry and "Rough Framing," Unit III in Carpentry.
2. Obtain specifications.
3. Obtain the tools, supplies and materials needed to complete this job.
4. Complete the job and have it evaluated.
5. Clean up the area and put the tools and supplies away.
6. Take the LAP test.

Principal Author(s): R. Arneson
T. Frisbee

CHECKLIST: Access Openings

______ Neat.

______ Square.

______ Measurements are accurate to ± 1/8".

______ Procedures are accepted in the industry.

______ Meets specifications.

Student: ____________________ File Code: 70.01.03.05. A2-2

Date: ____________________ Date Published: 6/12/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: ACCESS OPENINGS

1. Access openings are generally installed in the ceiling of:

   a. bedrooms.
   b. living rooms.
   c. passage ways.
   d. kitchens.

2. Access openings in a ceiling require doubling of:

   a. bridging.
   b. cripples.
   c. headers.
   d. joist hangers.

3. Access openings are generally installed in the ceiling of:

   a. living rooms.
   b. closets.
   c. bedrooms.
   d. kitchens.

4. If an access opening requires a ceiling joist to be cut, how many members must be installed to support the cut ceiling joist?

   a. 4.
   b. 1.
   c. 3.
   d. 2.

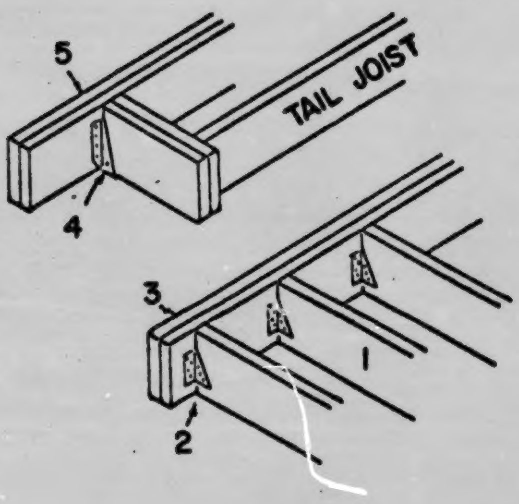


FIG. 1

5. In figure #1, which number identifies a ceiling tail joist?

   a. 3.
   b. 5.
   c. 1.
   d. 2.

6. In figure #1, which number identifies a joist hanger that is often used in access openings?

   a. 3.
   b. 2.
   c. 4.
   d. 5.

7. In figure #1, which of the following numbers corresponds to a framing anchor that is commonly used in an access opening?

   a. 5.
   b. 4.
   c. 1.
   d. 2.

8. Refer to figure #1. Which number identifies a typical double header illustration used in an access opening?

   a. 3.
   b. 1.
   c. 2.
   d. 4.

9. In figure #1, which of the following numbers identifies a typical double trimmer in a ceiling access opening? Remember that the direction of the tail joist must be kept in mind.

   a. 1.
   b. 3.
   c. 5.
   d. 2.

10. Which of the following is very similar to constructing an access opening in a ceiling?

    a. a stairwell rough opening.
    b. a window rough opening.
    c. a door rough opening.
    d. plumbing rough opening.

LAP TEST answer key: ACCESS OPENINGS

1. C
2. C
3. B
4. D
5. C
6. C
7. D
8. A
9. C
10. A

File Code: 70.01.03.06.A2-0

Date Published: 8/19/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Method of Building a Support Beam

OBJECTIVES:

Describe the method for building a specified support beam in a ceiling section.

Identify the components of a support beam and their characteristics and purposes.

EVALUATION PROCEDURE:

Description must be consistent with the specific support beam installation.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Blueprint Reading and Sketching, Carpentry Trades, Residential, Delmar Publishers.
Carpentry, Carpenters Printing Plant.
Modern Carpentry, Wagner.

PROCEDURE:

1. Read about support beams on page 121 in Modern Carpentry (see figure 7-24) and on page 100, Unit III in Carpentry.
2. Obtain specifications.
3. Describe the method for building specified support beam for evaluation (you may be asked to sketch a support beam.).
4. Take the LAP test.

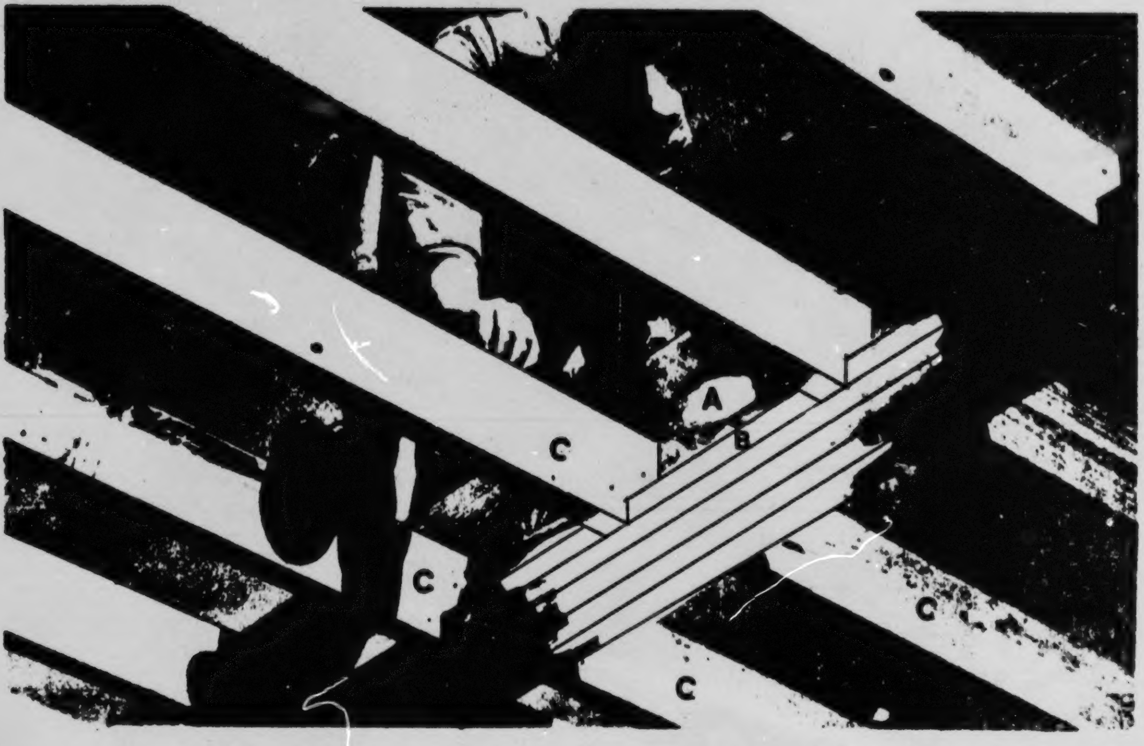
Principal Author(s): R. Arneson
T. Frisbee

Student: ______________________ File Code: 70.01.03.06. A2-2

Date: ______________________ Date Published: 6/12/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: METHOD OF BUILDING A SUPPORT BEAM



1. A support beam is used as a:

   a. flooring brace.
   b. rafter support.
   c. ceiling joist support.
   d. bearing partition support.

2. A support beam is positioned:

   a. below the ceiling joists.
   b. above the rafters.
   c. flush with the ceiling joists.
   d. even with the rafters.

3. A ledger strip provides:

   a. rigidity for rafter studs.
   b. strength for the support beam.
   c. support for the bearing partitions.
   d. additional support for the ceiling joists when connected to the support beam.

4. Which of the following support beams is most commonly used in residential housing?

   a. an "I" beam.
   b. solid.
   c. laminated.
   d. a "H" beam.

5. When additional support is needed in securing ceiling joists to the support beam, one should use:

   a. a ledger.
   b. heavy twine.
   c. electrican's tape.
   d. epoxy.

6. In the illustration, item "A" is a:

   a. strongback.
   b. spacer block.
   c. ceiling joist.
   d. support beam.

7. Which of the following methods is most commonly used for securing ceiling joists to a support beam?

   a. ring shank nailing.
   b. flush nailing.
   c. lag bolting.
   d. toenailing

8. Item "B" in the illustration provided is a:

   a. ledger strip.
   b. support beam.
   c. spacer block.
   d. rafter stud.

9. When should a support beam be used?

   a. to support the roof rafters.
   b. when called for by the blueprint.
   c. to add beauty to the structure.
   d. when support for the bearing partitions is needed.

10. In the illustration, items "C" are:

   a. rafter studs.
   b. ledger strips.
   c. ceiling joists.
   d. support beams.

LAP TEST answer key: METHOD OF BUILDING A SUPPORT BEAM

1. C
2. C
3. D
4. C
5. A
6. D
7. D
8. A
9. B
10. C

File Code: 70.01.03.07.A2-0

Date Published: 8/19/75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student:

Date:

PERFORMANCE ACTIVITY: Strongback Sketching

OBJECTIVES:

Sketch a specified strongback installed in a ceiling section.

Identify purpose and method of installation and components of a strongback.

EVALUATION PROCEDURE:

Sketch must be consistent with the specified strongback installation.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Carpentry, Carpenters Printing Plant.
Modern Carpentry, Wagner.
Ruler

PROCEDURE:

1. Read pages 152-153 in Modern Carpentry and pages 96, Unit III in Carpentry.
2. Obtain specifications.

   Keypoint: Any question you have should be discussed with the instructor.
3. Sketch the strongback as assigned.
4. Describe the strongback.
5. Have the sketch and description evaluated.
6. Take the LAP test.

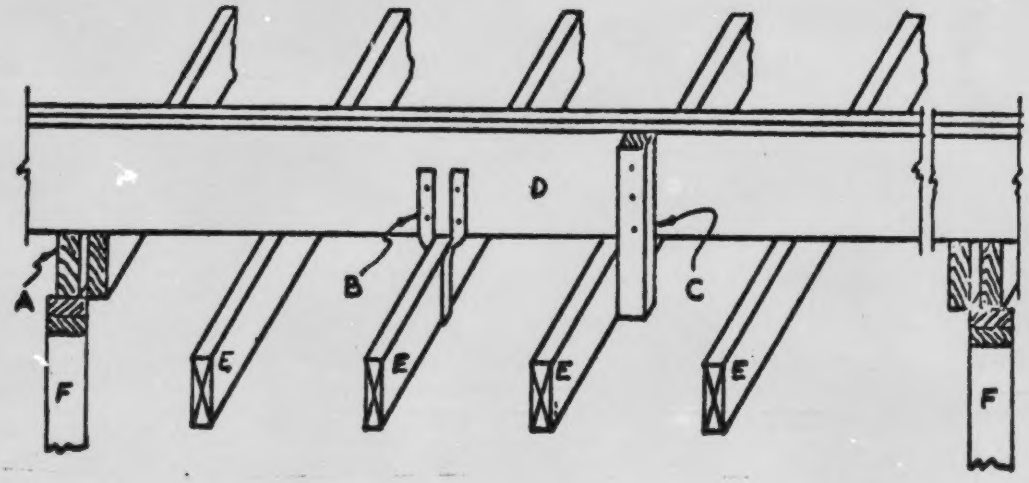
Principal Author(s): R. Arneson
T. Frisbee

Student: ____________________ File Code: 70.01.03.07. A2-2

Date: ____________________ Date Published: 6/12/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: STRONGBACK SKETCHING



1. Which of the following methods should be used to tie the ceiling joists and strongback together?

   a. electrican's tape.
   b. plumber's tape or a 2x2.
   c. epoxy.
   d. heavy twine.

2. When installing a strongback, stay lath is used to:

   a. align ceiling joists.
   b. support bearing partitions.
   c. brace rafters.
   d. prevent slippage of spacer blocks.

3. Item "A" in the illustration provided is:

   a. a stay lath.
   b. a bearing partition.
   c. a small joist.
   d. a spacer block.

4. Item "C" in the illustration provided is used to:

   a. provide alignment for the strongback.
   b. provide support for the ceiling joists.
   c. provide support for the strongback.
   d. keep the two (2) boards that make up the strongback together.

5. Item "D" in the illustration provided is:

   a. a ceiling joist.
   b. a strongback.
   c. a bearing partition.
   d. a cripple stud.

6. In the illustration provided, items "E" are:

   a. bearing partitions.
   b. ceiling joists.
   c. cripple studs.
   d. rafters.

7. In the illustration provided, items "F" are:

   a. bearing partitions.
   b. rafters.
   c. flooring studs.
   d. strongbacks.

8. The strongback is placed:

   a. above the row of ceiling joists.
   b. even with the row of ceiling joists.
   c. underneath the row of ceiling joists.
   d. even with the bearing partitions.

9. Strongbacks are required:

   a. by some building codes when the open span exceeds specified limits by a small amount.
   b. by some structures to assist in supporting bearing partitions.
   c. by some structures to provide extra support for cripple studs.
   d. by some structures to assist in bracing fill studs.

10. Spacer blocks are used:

a. to provide extra length for short strongbacks.
b. to provide extra height for short bearing partitions.
c. to provide extra length for short ceiling joists.
d. to provide the strongback with the needed heighth to straighten the ceiling joists.

LAP TEST answer key: **STRONGBACK SKETCHING**

1. B
2. A
3. D
4. B
5. B
6. B
7. A
8. C
9. A
10. A

Student: ____________________ File Code: 70.01.03.00. B2-2

Date: ____________________ Date Published: 6/11/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

UNIT POST-TEST: CEILING FRAMING

70.01.03.01.

1. How long would the members have to be for the ceiling joists in the dining room area: (See Plan)

   a. 10'.
   b. 8'.
   c. 16'.
   d. 14'.

2. What length of joists are required for the ceiling over the outside back porch area: (See Plan)

   a. 14'.
   b. 10'.
   c. 8'.
   d. 16'.

3. What size are the joists over the dining area: (See Plan)

   a. 2"x6".
   b. 2"x10".
   c. 2"x8".
   d. 2"x12".

4. By using the accompanying Plan sheet, one can assess that the ceiling joist material for the living room must be:

   a. 16' in length.
   b. 14' in length.
   c. 12' in length.
   d. 18' in length.

5. How many board feet are in one 2"x10"x8' board:

   a. 13.3 bd/ft
   b. 8 bd/ft
   c. 12 bd/ft
   d. 6 bd/ft

70.01.03.02.

6. Which of the following statements is true for the placement of ceiling joists:

   a. they are usually smaller than 2"x4" stock.
   b. they are usually placed in between rafters.
   c. they are usually placed the same as rafters.
   d. they are usually 18" on center.

7. When installing ceiling joists, in what position should the ceiling joist crown be placed:

   a. inclined.
   b. down.
   c. up.
   d. horizontal.

8. The members of a wall section that make it nonessential to install ceiling joists directly over studs are called:

   a. trimmers.
   b. double plates.
   c. cripples.
   d. sole plates.

9. Refer to the accompanying Plan. The ceiling joists for this residence are positioned:

   a. 12" O.C.
   b. 24" O.C.
   c. 18" O.C.
   d. 16" O.C.

10. Which number refers to an illustration of a ceiling joist layout that requires partition backing:

   a. 4.
   b. 1.
   c. 2.
   d. 3.

70.01.03.03.

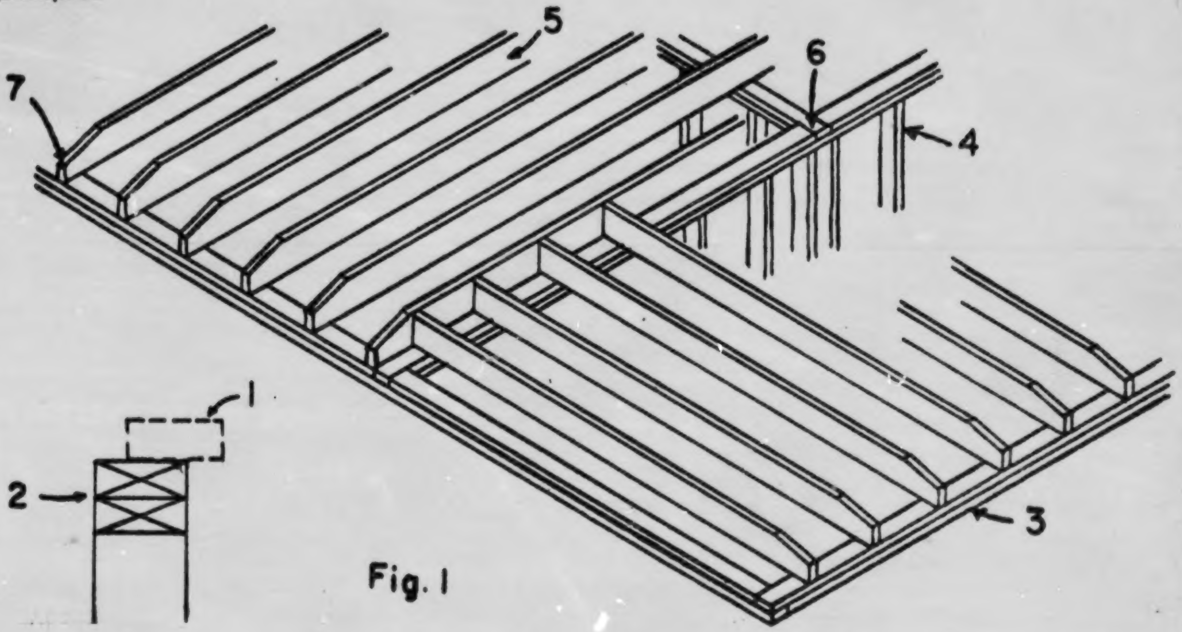


Fig. 1

11. In figure #1, the ceiling joists are turned at 90 degrees from each other in order to:

    a. span the longest length.
    b. span the shortest length.
    c. provide easy access.
    d. distribute the load over the longest span.

12. Which of the following is generally required on a hip roof that has a low slope:

    a. herringbone installation.
    b. bridging.
    c. stub ceiling joists.
    d. waynes coat installation.

13. Which of the following will be required at the outside edges of a structure, if the ceiling joists run 90 degrees to the roof rafters:

    a. herringbone installation.
    b. bridging
    c. stub ceiling joists.
    d. waynes coat installation.

70.01.03.03 continued

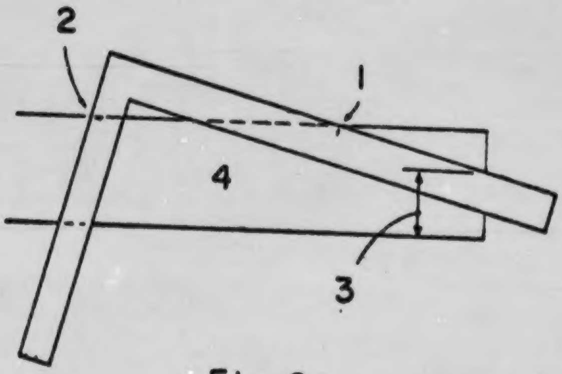


Fig. 2

14. In figure #2, which number indicates the unit run when tailing a ceiling joist:

    a. 2.
    b. 1.
    c. 3.
    d. 4.

15. In figure #2, which number illustrates the height of the roof rafter off the top plate:

    a. 1.
    b. 3.
    c. 2.
    d. 4.

70.01.03.04.

16. Which of the following is placed on the top of a partition that runs parallel with the ceiling joists:

    a. headers.
    b. fire blocking.
    c. backing.
    d. cripples.

70.01.03.04. continued

17. The member that provides the nailing surface for a residential ceiling covering is called:

    a. cripples.
    b. headers.
    c. trimmers.
    d. backing.

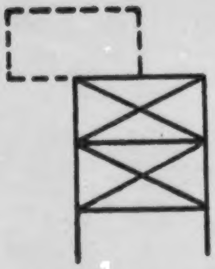
18. If a 2"x4" wide partition is running parallel with the ceiling joists, what is the minimum sized backing member that should be used:

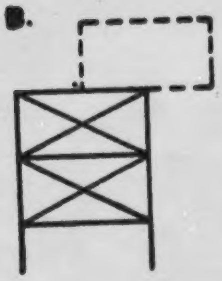
    a. 2"x8"
    b. 2"x6"
    c. 2"x4"
    d. 2"x10"

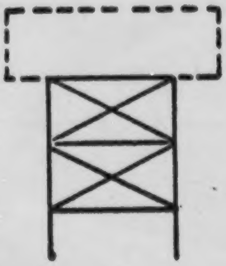
19. What is the minimum sized backing member to be used when a 2"x8" wide partition, running with the ceiling joists, is equipped with a wall hung water closet:

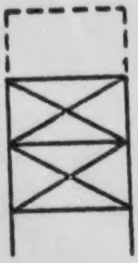
    a. 2"x6"
    b. 2"x8"
    c 2"x10"
    d. 2"x4"

20. **Which of the following is an illustration of backing on an interior partition:**

A.


B.


C.


D.


70.01.03.05.

21. In a ceiling access opening, framing anchors can be substituted for:

    a. joist hangers.
    b. bolts.
    c. screws.
    d. molly screws.

22. In which of the following shapes is a framing anchor bent:

    a. X
    b. L
    c. D
    d. ‾V‾

23. Which of the following members must be installed when a ceiling joist is cut to allow for an access opening:

    a. bridging.
    b. headers.
    c. waynes coat.
    d. post.

24. Joist hangers can be substituted for which of the following:

    a. bolts.
    b. framing anchors.
    c. screws.
    d. lag bolts.

70.01.03.05. continued

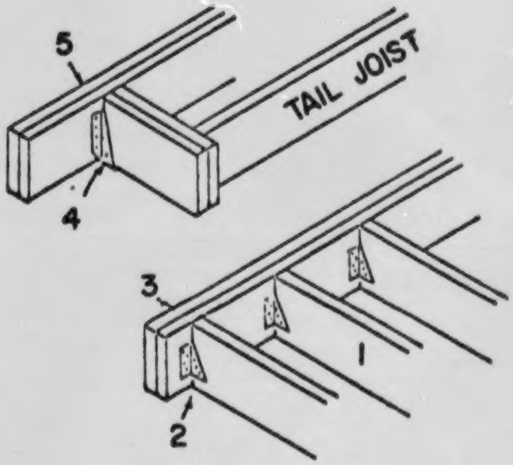
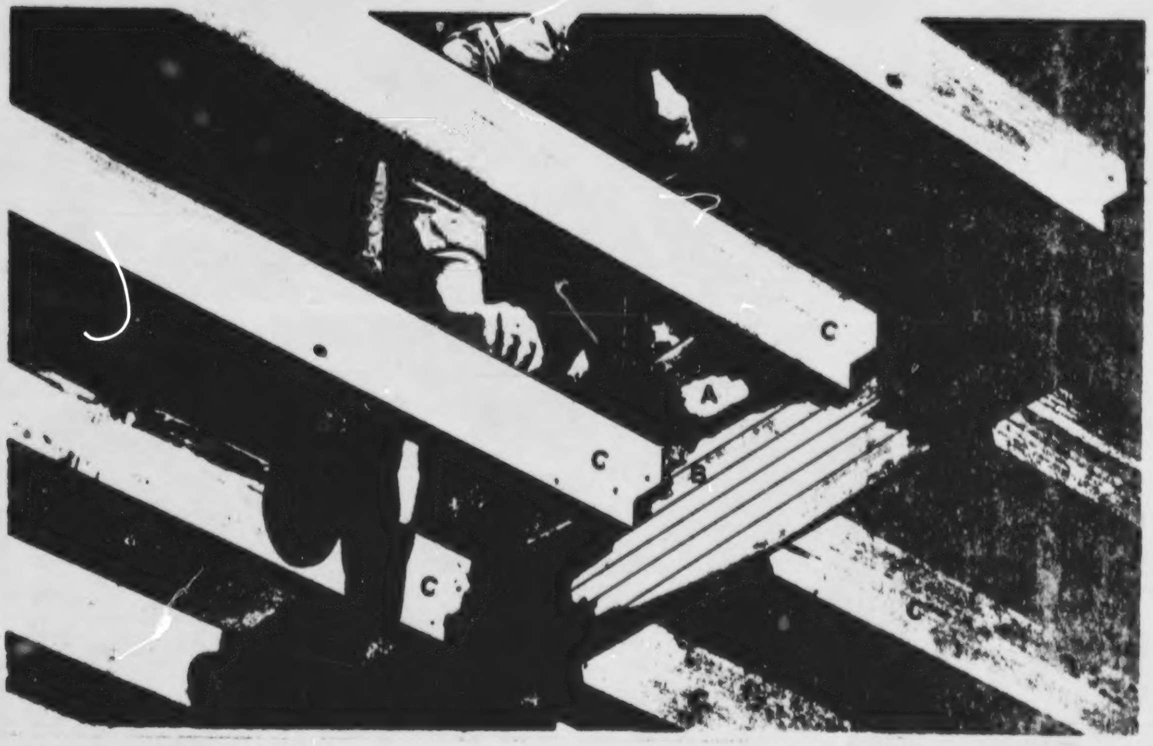

5
TAIL JOIST
4
3
1
2

FIG. 1

25. In figure #1, which number identifies a ceiling tail joist:

   a. 3.
   b. 5.
   c. 1.
   d. 2.

70. 01.03.00. B2-2



26. The ceiling joists are positioned:

    a. above the rafters.
    b. flush with the support beam.
    c. below the support beam.
    d. even with the rafters.

27. A ledger strip provides:

    a. rigidity for rafter studs.
    b. strength for the support beam.
    c. support for the bearing partitions.
    d. additional support for the ceiling joists when connected to the support beam.

28. A support beam should be installed:

    a. at the same time the ceiling joists are put up.
    b. before the ceiling joists are installed.
    c. at the same time the roof is being put up.
    d. after the ceiling joists are installed.

70.01.03.06. continued

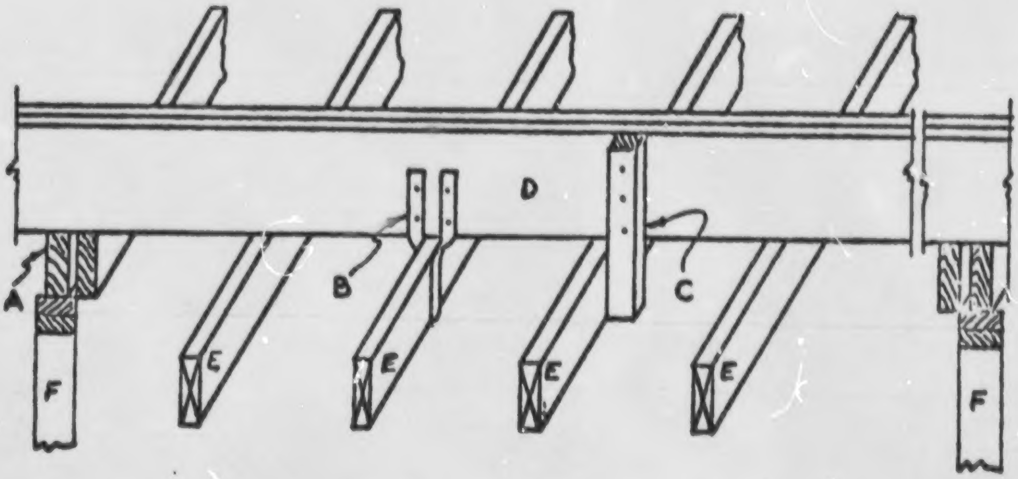
29. In the illustration, item "A" is a: (See page #8)

    a. strongback.
    b. spacer block.
    c. ceiling joist.
    d. support beam.

30. In the illustration, items "C" are: (See page #8)

    a. rafter studs.
    b. ledger stripes.
    c. ceiling joists.
    d. support beams.

70.01.03.07.



31. A strongback is used as a:

    a. flooring brace.
    b. rafter support.
    c. ceiling joist support.
    d. stud support.

70.01.03.07. continued

32. The first step in installing a strongback is to:

    a. tie ceiling joists and strongback together.
    b. place blocks on wall plates.
    c. place strongback on centerline and nail to blocks.
    d. align ceiling joists with stay lath.

33. Item "B" in the illustration provided is used to: (See page #9)

    a. provide support for the strongback.
    b. provide alignment for the strongback.
    c. provide support for the ceiling joists.
    d. keep the two (2) boards that make up the strongback together.

34. The strongback is positioned on the centerline to:

    a. align the spacer blocks.
    b. strengthen the bearing partitions.
    c. provide uniform support for the ceiling joists.
    d. provide support for the cripple studs.

35. Strongbacks are required:

    a. by some building codes when the open span exceeds specified limits.
    b. by some structures to assist in supporting bearing partitions.
    c. by some structures to provide extra support for cripple studs.
    d. by some structures to assist in bracing fill studs.

UNIT POST-TEST answer key: CEILING FRAMING

LAP		
01	1.	B
	2.	C
	3.	B
	4.	A
	5.	B
02	6.	C
	7.	C
	8.	B
	9.	D
	10.	B
03	11.	B
	12.	C
	13.	C
	14.	B
	15.	B
04	16.	C
	17.	D
	18.	B
	19.	C
	20.	C
05	21.	A
	22.	B
	23.	B
	24.	B
	25.	C
06	26.	B
	27.	D
	28.	A
	29.	D
	30.	C
07	31.	C
	32.	D
	33.	C
	34.	C
	35.	A

Student: ____________________ File Code: 70.01.03.00.A1-5

Date: ____________________ Date Published: 11-12-74

Family Pay Number: __________ Sex: M F (Circle 1)

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

UNIT PERFORMANCE TEST: CEILING FRAMING

OBJECTIVE:

Given a set of specifications the student will be able to construct an access opening.

TASK:

Layout and construct an access opening according to specifications and acceptable trade standards.

ASSIGNMENT:

CONDITIONS:

All necessary tools, equipment and supplies will be provided. Instructor will provide blueprint specifications. No assistance will be provided by other students.

RESOURCES:

(See attached page)

RESOURCES:

Claw hammer
Tape measure
Framing Square
Chalk and plumb line
Level
"T" bevel square
Combination square
Slot screwdriver
Power hand-saw
Power plane
Drill
Radial saw
Stapler
Utility knife
Phillips screwdriver
Assortment of fastners, shingles, and lumber

Student: ____________________ **File Code:** 70.01.03.00.A1-5

Date: ____________________ **Date Published:** 11-12-74

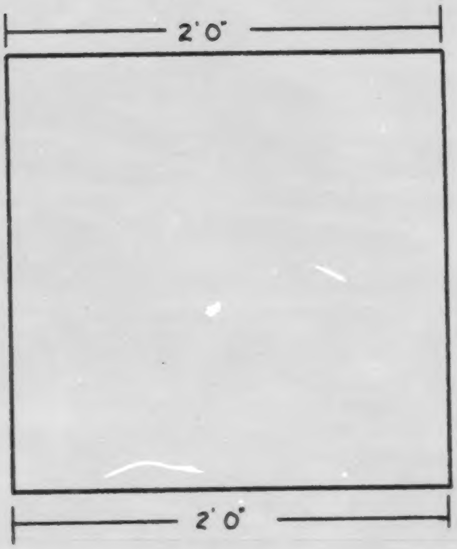
Family Pay Number: __________ Sex: M F (Circle 1)

PERFORMANCE CHECKLIST:

OVERALL PERFORMANCE: Satisfactory_____ Unsatisfactory_____

	CRITERION	
	Met	Not Met
Objective 1:		
1. Meets specified dimensions.		
Criterion: Measurements correct per specifications.		
2. Uses proper materials.		
Criterion: Meets specifications and FHA standards.		
3. Uses tools and equipment safely.		
Criterion: No injury to student or damage occurs.		
4. Opening is built properly.		
Criterion: Meets FHA standards and specifications.		
5. Job meets professional standards and specifications.		
Criterion: Specifications are listed in the Book.		
Blueprint Reading and Sketching for Carpenters, pp. 260-		
271.		
To obtain an overall score of satisfactory, student must		
meet criterion on 4/5 line items.		

ACCESS OPENING



File Code: 70.01.04.00.A2-1

Date Published: 8-21-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Experience Guide

UNIT: ROOF

RATIONALE:

Materials and procedure knowledge about roof construction is important to a carpenter. Using this knowledge and developing performance skills in quality roof component assembly and installation will add another set of capabilities necessary for becoming a qualified carpenter. This unit is designed to direct you in achieving these capabilities.

PREREQUISITES:

Prerequisites for this roof unit are the same as those for the course. Course prerequisites are listed in the Rough-in course guide.

OBJECTIVES:

Given tools, equipment, materials and the construction prints and specifications, the student will:

Use the basic terms for parts and dimensions in roof construction.

Lay out, cut, and install various types of roof construction components.

Determine the material needs for a roof constrction.

RESOURCES:

Printed Materials

Blueprint Reading and Sketching, Carpentry Trades, Residential. Delmar Publishers, 1957.
Modern Carpentry. Willis H. Wagner, The Goodheart-Willcox Company, Inc., 1973.
The Steel Square. L. Perth, Stanley Tools, 1967.

Equipment

Bar, flat rip.
Hammer, claw (13 oz. and 20 oz.).
Hatchet, shinglers.
Knife, utility.
Level, spirit.
Line, chalk.
Plumb bob.
Saw, hand crosscut.

Principal Author(s): Lyle Leland

Saw, power hand (6½" blade).
Saw, radial arm.
Shears, tinners (long handle).
Square, combination.
Square, framing.
Stapler, squeeze type (Bostitch T-5 size).
Tape measure (12 ft.).

GENERAL INSTRUCTIONS:

This unit consists of 13 Learning Activity Packages (LAPs). Each LAP will provide specific information for completion of a learning activity.

The general procedure for this unit is as follows:

(1) Read the first assigned Learning Activity Package (LAP).
(2) Begin and complete the first assigned LAP.
(3) Take and score the LAP test.
(4) Turn in the LAP test answer sheet.
(5) Determine the reason for any missed items on the LAP test.
(6) Proceed to and complete the next assigned LAP in the unit.
(7) Complete all required LAPs for the unit following steps 3 through 6.
(8) In this Unit, there are some LAPs that have tests combined with other LAP tests. These combined tests are taken after completing the last LAP covered by the test.
(9) Take the unit tests as described in the Unit LEG "Evaluation Procedures".
(10) Proceed to the next assigned unit.

PERFORMANCE ACTIVITIES:

.01 Span, Run, Rise, And Overhang
.02 Rafter Cut Identification
.03 Common Rafter Layout
.04 Common Rafter Installation
.05 Hip and Valley Rafter
.06 Roof Truss
.07 Gable Studs
.08 Roof Sheathing
.09 Felt Paper
.10 Inter-Lock Shingles
.11 Wood Shingles
.12 Three-Tab Shingles
.13 Ordering Roof Section Materials

EVALUATION PROCEDURE:

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.

3. The student then takes a unit performance test if the unit pretest was successfully completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes a multiple-choice unit post test and a unit performance test.
2. Successful unit completion is meeting the listed criteria for the performance test.

FOLLOWTHROUGH:

Complete reading this unit guide and then obtain the LAP for the first assigned performance activity. Read the LAP and carefully follow the steps in the procedure section. Use the knowledge and skills you have acquired in the performance of each activity for this unit.

Student: ______________________ File Code: 70.01.04.00.A2-2

Date: ______________________ Date Published: 6-18-74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

UNIT PRETEST: ROOF

70.01.04.01 and 70.01.04.02

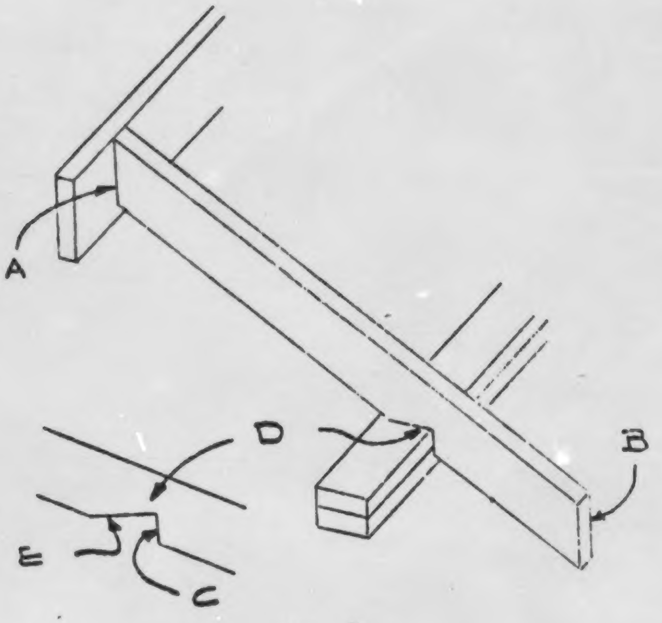


Fig. 2

1. What type of rafter cut is depicted by letter "A" in figure #2?

   a. tail
   b. ridge
   c. plumb
   d. seat

2. Using figure #2, identify cut "B".

   a. bird's-mouth
   b. tail
   c. plumb
   d. seat

70.01.04.01 and 70.01.04.02 (continued)

3. Identify cut "C" in figure #2.

   a. plumb
   b. seat
   c. tail
   d. overhang

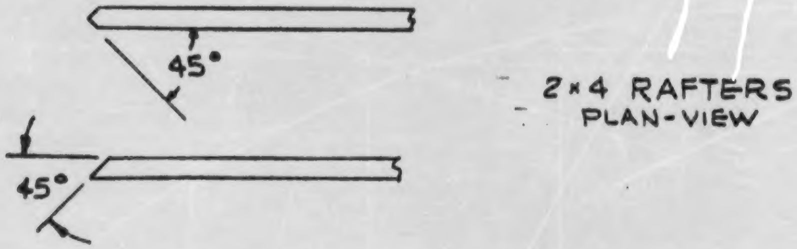


Fig. 3

4. Using figure #3, identify the name for the 45 degree cut.

   a. end
   b. seat
   c. tail
   d. side

5. A side cut can be used at the point a hip rafter joins with a:

   a. overhang
   b. gable
   c. span
   d. ridge

70.01.04.03

6. In order to establish the plumb cut on a common rafter, the craftsman should use a:

   a. steel square.
   b. plumb bob.
   c. T-square.
   d. chalk line.

7. The angle cut used on the bottom of a rafter is a:

   a. seat cut.
   b. plumb cut.
   c. side cut.
   d. cheek cut.

70.01.04.03 (continued)

8. Which of the following terms indicates the incline of a roof as a ratio of the vertical rise to the horizontal run?

   a. slope
   b. slant
   c. pitch
   d. angle of linearity

9. After a carpenter has used the step-off method to layout a common rafter, what should he use to check his work?

   a. steel tape
   b. plumb line
   c. rafter tables
   d. folding rule

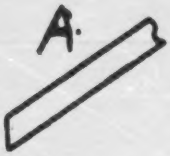
10. The angle cut used on the top of a rafter is a:

    a. side cut.
    b. seat cut.
    c. plumb cut.
    d. cheek cut.

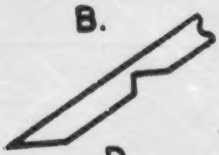
70.01.04.04

11. Which of the following illustrations depicts a common rafter with an overhang?

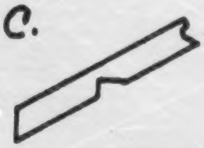
A.



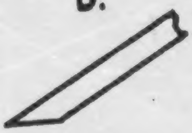
B.



C.



D.



12. When a rafter has an overhang, the overhang should be measured:

    a. horizontally from the wall line.
    b. along the rafter.
    c. vertically from the ground line.
    d. along any exposed portion.

70.01.04.04 (continued)

13. What type of saw should be used when cutting a board perpendicular to the grain of the wood?

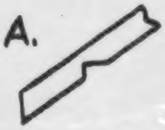
    a. meat saw
    b. rip saw
    c. cross-cut saw
    d. hack saw

14. Whicn of the following items is used by an experienced carpenter to join rafters to the rafter plate?

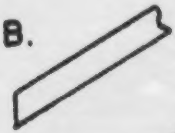
    a. molly screws
    b. lag bolts only
    c. 12d nails only
    d. framing anchors

15. Which of the following illustrations depicts a common rafter without an overhang?

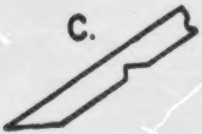
A.



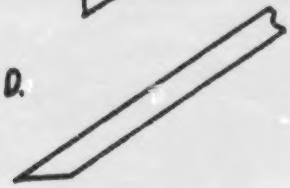
B.



C.



D.



70.01.04.05

16. Intersecting gable roofs form a:

    a. building line.
    b. ridge.
    c. hip roof.
    d. double top plate.

17. One type of rafter used on a hip roof is a:

    a. frieze.
    b. ridge.
    c. lookout.
    d. common.

70.01.04.05 (continued)

18. On a plan view, the hip rafter will appear as a diagonal of a:

    a. rafter.
    b. rectangle.
    c. circle.
    d. square.

19. An important tool used by the carpenter to figure rafter lengths is the:

    a. carpenter's folding rule.
    b. steel tape.
    c. plumb line.
    d. framing square.

20. Valley rafters are laid out in the same manner as:

    a. ridges.
    b. hip rafters.
    c. gable end frames.
    d. plates.

70.01.04.06

21. The piece of plywood that is both nailed and glued to all truss joints is called a:

    a. flange.
    b. bearing stud.
    c. cripple stud.
    d. gusset.

22. A bottom chord is the same as a:

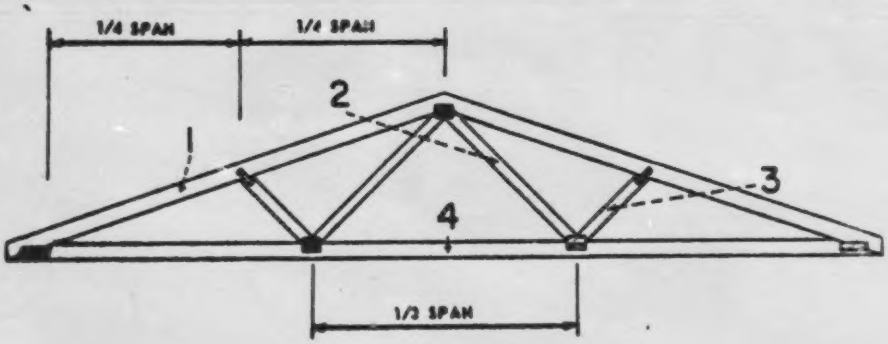
    a. compression web.
    b. tension web.
    c. roof rafter.
    d. ceiling joist.

23. Which of the following best describes the purpose of a roof truss?

    a. Purlin supports.
    b. A frame that provides support for the wall studs.
    c. A structural member that is supported by the ceiling joists.
    d. A frame that carries the roof and ceiling surfaces.

70.01.04.06 (continued)

The following two questions refer to the illustration provided below.



24. Identify item #1.

    a. tension web.
    b. top chord
    c. compression web
    d. ceiling joist

25. Identify item #4.

    a. top chord
    b. tension web
    c. compression web
    d. bottom chord

70.01.04.07

26. Gable stud lengths can be determined by using a:

    a. ridge pole.
    b. plumb line.
    c. level.
    d. framing square.

70.01.04.08

27. In relation to roof coverings, sheathing serves:

    a. no purpose.
    b. as a nailing base.
    c. as a moisture barrier.
    d. as a heat dissipator for the building.

70.01.04.08 (continued)

28. One type of commonly used sheathing is:

    a. plywood.
    b. bevel boards.
    c. clap boards.
    d. gypsum board.

29. When installing wood shingles, tile, or metal sheets, the sheathing may be spaced according to the:

    a. rise.
    b. span length.
    c. course arrangement.
    d. run.

30. Around chimney openings, sheathing should have a:

    a. 2" opening.
    b. flush fit.
    c. ½" opening.
    d. 3" opening.

70.01.04.09

31. Underlayment should only be applied when:

    a. the roof is dry.
    b. the temperature is under 80 degrees.
    c. necessary.
    d. the building codes require it.

32. Felt paper is generally sold by the

    a. roll.
    b. 2' x 4' sheet.
    c. 4' x 8' sheet.
    d. pound.

33. Saturated felts, used under shingles, consists of dry felt impregnated with coal tar or:

    a. linseed oil.
    b. gravel.
    c. marble dust.
    d. asphalt.

70.01.04.09 (continued)

34. The most common weight of saturated felt is:

  a. 6 lbs.
  b. 15 lbs.
  c. 4 lbs.
  d. 32 lbs.

35. The pound weight used in identifying roofing materials is the amount needed to cover a roof area of:

  a. 50 sq. ft.
  b. 100 sq. ft.
  c. 125 sq. ft.
  d. 150 sq. ft.

70.01.04.10

36. What might affect putting a new shingle roof on top of an existing old one?

  a. the strength of the existing deck
  b. the color of the old roof
  c. the roof slope
  d. the roof rise

37. What should be installed at the point a shingle roof joins a vertical wall?

  a. rain gutter
  b. metal flashing
  c. metal drip edge
  d. special ridge shingles

70.01.04.11

38. Wood shingles are packaged in bundles capable of covering:

  a. 60 sq. ft.
  b. 100 sq. ft.
  c. 200 sq. ft.
  d. 150 sq. ft.

39. From the outer edge of each shingle, nails should be placed at not more than:

  a. 1 inch.
  b. 3/4 inch.
  c. 1 1/2 inch.
  d. 1/4 inch.

70.01.04.11 (continued)

40. Which of the following nails is used for overroof construction?

a. 10 d.
b. 3 d.
c. 4 d.
d. 5 d.

70.01.04.12

41. The shipping weight per square of 3 tab shingles is:

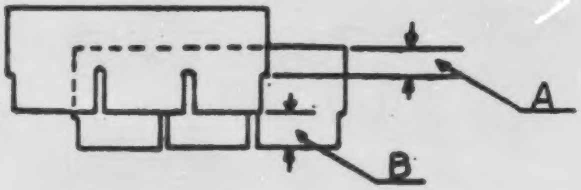
a. 300 - 350 lbs.
b. 235 - 300 lbs.
c. 150 - 200 lbs.
d. 100 - 200 lbs.

42. The length of a 2 tab shingle is:

a. 36".
b. 24".
c. 18".
d. 40".

43. To provide a smooth surface for applying asphalt shingles over wooden ones, a mechanic should first install:

a. heavy tar paper.
b. a backer board.
c. a metal drip edge.
d. starter strips.



44. Refer to the illustration above. What is the area "B" called?

a. exposure
b. head lap
c. side lap
d. single butt

70.01.04.12 (continued)

45. One reason to use starter strips is to:

    a. improve appearance.
    b. fill space between tabs.
    c. add labor time.
    d. provide a drip edge.

70.01.04.13

The following five questions refer to the Building Trades Blueprints for Carpenters.

46. What type of shingles are required on this structure?

    a. wood
    b. asphalt
    c. tile
    d. built-up

47. What is the length of overhang on this house?

    a. 4'
    b. 2'
    c. 3'
    d. 1'

48. Where is a gable end found on this house?

    a. back
    b. front
    c. bedroom end
    d. garage end

49. What type of hip is found on this house?

    a. wood
    b. metal
    c. Boston
    d. fiberglass

50. How many square feet does a "square" of shingles cover?

    a. 100 sq. ft.
    b. 150 sq. ft.
    c. 120 sq. ft.
    d. 75 sq. ft.

UNIT PRETEST ANSWER KEY: ROOF

LAP 01 & 02

1. c
2. b
3. a
4. d
5. d

LAP 03

6. a
7. b
8. a
9. c
10. c

LAP 04

11. c
12. a
13. c
14. d
15. d

LAP 05

16. c
17. d
18. d
19. d
20. b

LAP 06

21. d
22. d
23. d
24. b
25. d

LAP 07

26. d

LAP 08

27. b
28. a
29. c
30. c

LAP 09

31. a
32. a
33. d
34. b
35. b

LAP 10

36. a
37. b

LAP 11

38. b
39. b
40. d

LAP 12

41. b
42. a
43. b
44. a
45. b

LAP 13

46. b
47. b
48. a
49. c
50. a

**Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231**

File Code: 70.01.04.01.A2-0

Date Published: 8-21-75

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Span, Run, Rise and Overhang

OBJECTIVE:

Identify span, run, rise and overhang on a sketch of common, hip, valley and jack rafters.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP that is combined with the "Identifying Rafter Cuts" LAP test and taken after completing that LAP.

RESOURCES:

Modern Carpentry, Wagner.

PROCEDURE:

1. Read page 159 in Modern Carpentry.
2. When you can identify the rafter terms for the instructor proceed to the next LAP.

Principal Author(s): R. Arneson

File Code: 70.01.04.02.A2-0

Date Published: 8-21-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Rafter Cut Identification

OBJECTIVE:

Identify the following cuts on a common rafter: plumb cut, seat cut, tail cut, and side cut.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Framing square
Steel tape (12 ft.)

PROCEDURE:

1. Read page 159 in Modern Carpentry.
2. If you can identify the rafter cuts to the satisfaction of the instructor, take the LAP test. If you cannot identify them, proceed as directed by the instructor.

Principal Author(s): R. Arneson

Student: ____________________

File Code: 70.01.04.01.A2-2
70.01.04.02.A2-2

Date: ____________________

Date Published: 6-18-74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: SPAN, RUN, RISE AND OVERHANG/ RAFTER CUT IDENTIFICATION

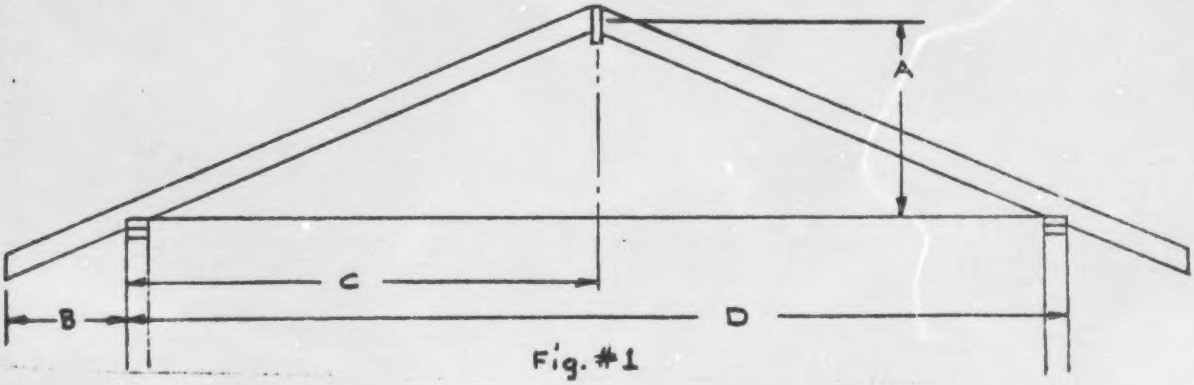


Fig. #1

1. Using figure #1, identify letter "A".

   a. pitch
   b. rise
   c. span
   d. run

2. Identify letter "B" in figure #1.

   a. overhang
   b. rise
   c. pitch
   d. soffit

3. What does the letter "C" stand for in figure #1?

   a. span
   b. rise
   c. run
   d. ridge

4. The ratio of the vertical rise to the horizontal run on an incline roof is called the:

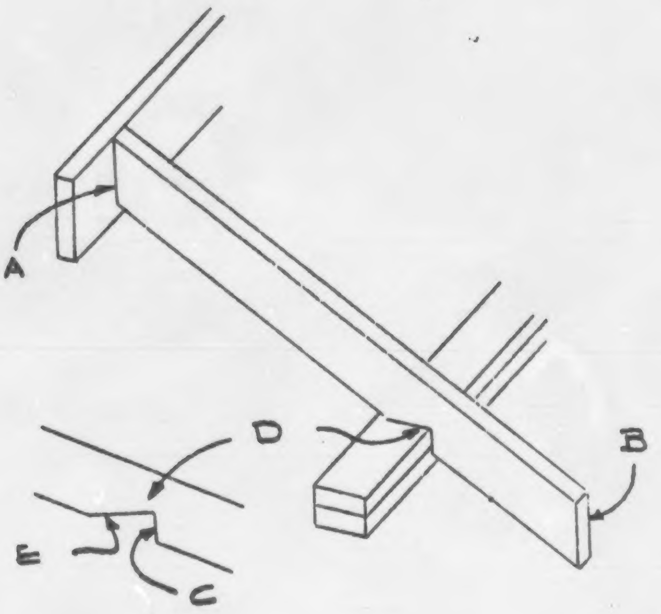
   a. overhang.
   b. rafter length.
   c. slope.
   d. pitch.

5. If the total rise is 4 feet and the total span is 24 feet, the pitch would be:

   a. 6.
   b. 1/8.
   c. 2/12.
   d. 1/6.

6. The ratio of the vertical rise to the horizontal span on an incline roof is called the:

   a. slope.
   b. pitch.
   c. rafter length.
   d. stud

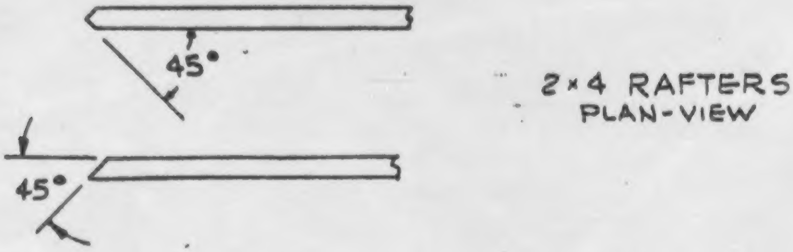


7. What type of rafter cut is depicted by letter "A" in figure #2?

   a. tail
   b. ridge
   c. plumb
   d. seat

8. Identify cut "E" in figure #2.

   a. plate
   b. plumb
   c. tail
   d. seat



9. Using figure #3, identify the name for the 45 degree cut.

   a. end
   b. seat
   c. tail
   d. side

10. A side cut can be used at the point a hip rafter joins with a:

   a. overhang.
   b. gable.
   c. span.
   d. ridge.

LAP TEST ANSWER KEY: SPAN, RUN, RISE AND OVERHANG/ RAFTER CUT IDENTIFICATION

1. b
2. a
3. c
4. c
5. d
6. b
7. c
8. d
9. d
10. d

File Code: 70.01.04.03.A2-0

Date Published: 8-21-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Common Rafter Layout

OBJECTIVE:

Lay out a common rafter according to instructor's specifications.

Follow practices accepted in the industry.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Blueprint Reading and Sketching, Carpentry Trades, Residential, Delmar Publishers.
Modern Carpentry, Wagner.
The Steel Square, Perth.

Framing square
Tape measure (12 ft.)

PROCEDURE:

1. Read pages 157-163 in Modern Carpentry.
2. Review the material in The Steel Square.
3. Obtain specifications from the instructor.
4. Obtain the tools, supplies and materials needed to complete this job.
   Note: You may want to review Blueprint Reading and Sketching, Carpentry Trades, Residential regarding rafters.
5. Complete the job and obtain evaluation by the instructor.

Principal Author(s): R. Arneson
T. Frisbee

Student: ______________________ File Code: 70.01.04.03.A2-2

Date: ______________________ Date Published: 6-18-74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: COMMON RAFTER LAYOUT

1. Which of the following methods can be used to layout a common rafter?

   a. plumb method
   b. rule method
   c. tape method
   d. step-off method

2. Which of the following formulas is used to determine the pitch of a roof?

   a. rise/span
   b. rise/run
   c. rise/½ of the span
   d. rise/½ of the run

3. The basic layout tool framing is the:

   a. plumb line.
   b. carpenter's folding rule.
   c. steel tape.
   d. framing square.

4. Roof framing is based largely on the properties of the:

   a. right triangle.
   b. isosceles triangle.
   c. scalene triangle.
   d. equilateral triangle.

5. If the wall framing is already in place, what additional information is needed by the carpenter to visualize roof framing?

   a. The unit run and amount of materials needed.
   b. The slope of the roof and the amount of overhang required.
   c. The type and amount of materials required.
   d. The slope and unit run of the roof.

6. Which of the following terms indicates the incline of a roof as a ratio of the vertical rise to the horizontal run?

   a. slope
   b. slant
   c. pitch
   d. angle of linearity

7. After a carpenter has used the step-off method to layout a common rafter, what should he use to check his work?

   a. steel tape
   b. plumb line
   c. rafter tables
   d. folding rule

8. Common rafters can be cut to:

   a. only the nearest foot.
   b. any length.
   c. only the nearest inch.
   d. only the nearest millimeter.

9. When laying out common rafters, they should always be measured to the nearest:

   a. 1/4 of an inch.
   b. inch.
   c. 1/16 of an inch.
   d. 1/8 of an inch.

10. What is the slope of a roof that rises at the rate of 4 inches for each foot of run?

   a. 4 in 8
   b. 6 in 12
   c. 2 in 8
   d. 4 in 12

LAP TEST ANSWER KEY: COMMON RAFTER LAYOUT

1. d
2. a
3. d
4. a
5. b
6. a
7. c
8. b
9. c
10. d

File Code: 70.01.04.04.A2-0

Date Published: 8-21-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Common Rafter Installation

OBJECTIVES:

Cut and install common rafters according to instructor's specifications following practices accepted in the industry.

Identify characteristics of a common rafter.

Identify procedures, equipment and materials used in cutting and installing a common rafter.

EVALUATION PROCEDURE:

Preparation and installation meet the criteria listed on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Power hand saw

PROCEDURE:

1. Obtain the tools needed to complete this job.
2. Complete the job and obtain instructor evaluation.
3. Take the LAP test.

Principal Author(s): R. Arneson
T. Frisbee

CHECKLIST: COMMON RAFTER INSTALLATION

_______ Fastened properly.

_______ Neat.

_______ Square.

_______ Measurements are accurate to ± 1/8".

_______ Procedures are accepted in the industry.

_______ Meets specifications.

Student: ______________________ File Code: 70.01.04.04.A2-2

Date: ______________________ Date Published: 6-18-74

Mountain-Plains Education &
Economic Development
Pr[illegible], Inc.
Glasgow AFB, Montana 59231

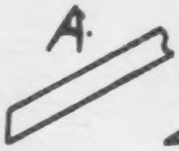
LAP TEST: COMMON RAFTER INSTALLATION

1. How should rafters be nailed to the rafter plate?

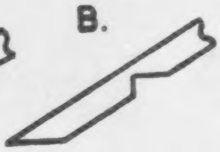
   a. Supported by small blocks of wood nailed to the rafter plate.
   b. Two nails driven vertically through both the rafter and rafter plate.
   c. Toe-nailed on one side.
   d. Toe-nailed on both sides.

2. Which of the following illustrations depicts a common rafter with an overhang?

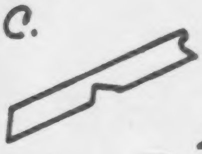
A.



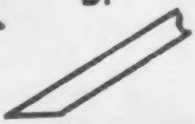
B.



C.



D.



3. Common rafters without an overhang should:

   a. overhang the rafter plate by ¼ inch.
   b. be ¼ inch from the rafter plate.
   c. be flush with the rafter plate.
   d. rest exactly on ½ of the rafter plate.

4. What type of saw should be used for cutting a board parallel with the grain of the wood?

   a. rip saw
   b. cross-cut saw
   c. hack saw
   d. meat saw

5. When a rafter has an overhang, the overhang should be measured:

   a. horizontally from the wall line.
   b. along the rafter.
   c. vertically from the ground line.
   d. along any exposed portion.

6. Which of the following methods correctly describes rafter installation procedure?

   a. Install all the rafters on one side and then all on the other side.
   b. Install the end rafters and then install the rafters opposite of each other in a random manner.
   c. Install a rafter on one side and then one on the opposite side directly across from it.
   d. Install the rafters in any manner just to get them in place.

7. What type of saw should be used when cutting a board perpendicular to the grain of the wood?

   a. meat saw
   b. rip saw
   c. cross-cut saw
   d. hack saw

8. Which of the following items is used by an experienced carpenter to join rafters to the rafter plate?

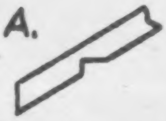
   a. molly screws
   b. lag bolts only
   c. 12d nails only
   d. framing anchors

9. When cutting a common rafter, the craftsman should use a saw equipped with:

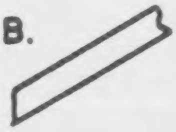
   a. a cross-cut blade.
   b. a straight blade.
   c. a ripping blade.
   d. any blade that is handy.

10. Which of the following illustrations depicts a common rafter without an overhang?

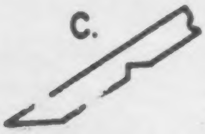
A.



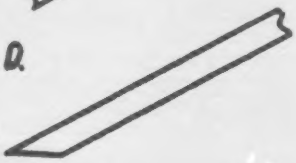
B.



C.



D.



LAP TEST ANSWER KEY: COMMON RAFTER INSTALLATION

1. a
2. d
3. c
4. a
5. a
6. b
7. c
8. d
9. a
10. d

File Code: 70.01 04.05.A2-0

Date Published: 8-21-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student:

Date:

PERFORMANCE ACTIVITY: Hip and Valley Rafter

OBJECTIVE:

Lay out and cut a hip or valley rafter according to specifications following practices accepted in the industry.

Identify characteristics of a hip and valley rafter.

EVALUATION PROCEDURE:

Layout and cutting meets the criteria listed on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Framing square
Power hand saw (6½" blade)
Tape measure (12 ft.)

PROCEDURE:

1. Read page 166 in Modern Carpentry.
2. Obtain specifications.
3. Obtain the tools, supplies and materials needed to complete this job.
4. Complete the job and have it evaluated.
5. Clean up the area and put the tools and supplies away.
6. Take the LAP test.

Principal Author(s): R. Arneson
T. Frisbee

CHECKLIST: HIP AND VALLEY RAFTER

_______ Neat.

_______ Square.

_______ Measurements are accurate to ± 1/8".

_______ Procedures are accepted in the industry.

_______ Meets specifications listed.

Student: ____________________ File Code: 70.01.04.05.A2-2

Date: ____________________ Date Published: 6-18-74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: HIP AND VALLEY RAFTER

1. Intersecting gable roofs form a:

   a. building line.
   b. ride.
   c. hip roof.
   d. double top plate.

2. When installing a hip roof, the first pieces of wood cut are the common rafters and the:

   a. overhangs.
   b. plates.
   c. ridge boards.
   d. bird's-mouth.

3. An item that must be considered when determining the ridge length of a hip roof is:

   a. valley length.
   b. the common rafters.
   c. twice the run.
   d. rafter stock.

4. When two roof surfaces slant upwards from adjoining walls, they meet on a sloping line called a:

   a. hip.
   b. ridge.
   c. common.
   d. truss.

5. Which of the following rafters can be used on a hip roof?

   a. soffit
   b. stud
   c. jack
   d. facia

6. One type of rafter used on a hip roof is a:

   a. frieze.
   b. ridge.
   c. lookout.
   d. common.

7. On a plan view, the hip rafter will appear as a diagonal of a:

   a. rafter.
   b. rectangle.
   c. circle.
   d. square.

8. An important tool used by the carpenter to figure rafter lengths is the:

   a. carpenter's folding rule.
   b. steel tape.
   c. plumb line.
   d. framing square.

9. On a plan view, valley rafters will appear as a diagonal of a:

   a. square.
   b. rectangle.
   c. circle.
   d. building line.

10. Valley rafters are laid out in the same manner as:

   a. ridges.
   b. hip rafters.
   c. gable end frames.
   d. plates.

LAP TEST ANSWER KEY: HIP AND VALLEY RAFTER

1. c
2. c
3. c
4. a
5. c
6. d
7. d
8. d
9. a
10. b

File Code: 70.01.04.06.A2-0

Date Published: 8-21-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Roof Truss

OBJECTIVE:

Construct a roof truss, either real or simulated, which meets specifications and procedures established for the industry.

Identify characteristics and components of a roof truss.

EVALUATION PROCEDURE:

Construction meets the criteria listed on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Framing square
Power hand saw (6½" blade)
Tape measure (12 ft.)

PROCEDURE:

1. Read pages 177-180 in Modern Carpentry.
2. Obtain specifications.
3. Obtain the tools, supplies and materials needed to complete this job.
4. Complete the job and have it evaluated.
5. Clean up the area and put tools and supplies away.
6. Take the LAP test.

Principal Author(s): R. Arneson

Check List: ROOF TRUSS

1. ________ Fastened properly.
2. ________ Neat.
3. ________ Square.
4. ________ Measurements are accurate to ± 1/8 inch.
5. ________ Procedures are accepted in the industry.
6. ________ Meets specifications listed

Student: ____________________ File Code: 70.01.04.06.A2-2

Date: ____________________ Date Published: 6-18-74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: ROOF TRUSS

1. The principle used in truss design is based on the rigidity of the:
   - a. polygon.
   - b. rectangle.
   - c. square.
   - d. triangle.

2. The piece of plywood that is both nailed and glued to all truss joints is called a:
   - a. flange.
   - b. bearing stud.
   - c. cripple stud.
   - d. gusset.

3. Trusses for residential structures can normally be erected:
   - a. without special equipment.
   - b. with an "A" frame.
   - c. with a small, transportable crane.
   - d. with the special equipment prescribed.

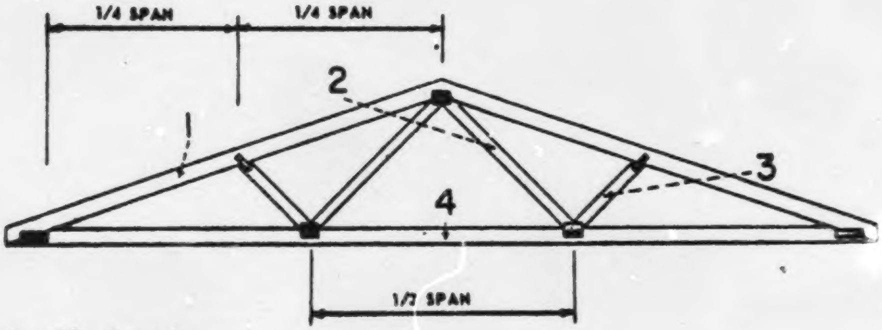
4. A bottom chord is the same as a:
   - a. compression web.
   - b. tension web.
   - c. roof rafter.
   - d. ceiling joist.

5. Which of the following is a commonly used roof truss?
   - a. standard Z
   - b. V-type
   - c. Johnson-Masterson
   - d. standard W

6. Which of the following materials should be used for installing truss rafters?

   a. glue and nails
   b. nails only
   c. glue only
   d. screws only

The following four questions refer to the illustration provided below.



7. Identify item #1.

   a. tension web
   b. top chord
   c. compression web
   d. ceiling joist

8. What is the proper term for item #2?

   a. ceiling joist
   b. bottom chord
   c. top chord
   d. tension web

9. Which of the following identifies item #3?

   a. compression web
   b. roof rafter
   c. bottom chord
   d. tension web

10. Identify item #4.

   a. top chord
   b. tension web
   c. compression web
   d. bottom chord

LAP TEST ANSWER KEY: **ROOF TRUSS**

1. d
2. d
3. a
4. d
5. d
6. a
7. b
8. d
9. a
10. d

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 70.01.04.07.A2-0

Date Published: 8-21-75

Learning Activity Package

Student:

Date:

PERFORMANCE ACTIVITY: Gable Studs

OBJECTIVE:

Lay out, cut and install gable studs to meet specifications and procedures established for the industry.

Identify terms used with gable studs and procedures for preparing and installing them.

EVALUATION PROCEDURE:

Preparation and installation meets the criteria listed on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP. This test is combined with the "Roof Sheathing" LAP test and isttaken after completing that LAP.

RESOURCES:

Modern Carpentry, Wagner.

Claw hammer (20 oz.)
Framing square
Power hand saw (6½" blade)
Tape measure (12 ft.)

PROCEDURE:

1. Read pages 165-167 in Modern Carpentry.
2. Obtain specifications.
3. Obtain the tools, supplies and materials needed to complete this job.
4. Complete the job and have it evaluated.
5. Clean up the area and put tools and supplies away.
6. Proceed to the next LAP.

Principal Author(s): R. Arneson

Check List: Gable Studs

1. ________ Fastened properly.
2. ________ Neat.
3. ________ Square.
4. ________ Measurements are accurate to ± 1/8 inch.
5. ________ Procedures are accepted in the industry.
6. ________ Meets specifications listed.

File Code: 70.01.04.08.A2-0

Date Published: 8-21-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Roof Sheathing

OBJECTIVES:

Install roof sheathing according to specifications following procedures accepted in the industry.

Identify characteristics of, purposes for and procedures involved in installing roof sheathing.

EVALUATION PROCEDURE:

Installation meets the criteria listed on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Claw hammer (16 or 20 oz.)
Power hand saw (6½" blade)
Tape measure (12 ft.)

PROCEDURE:

1. Read pages 180-182 in Modern Carpentry.
2. Obtain specifications.
3. Obtain the tools, supplies, and materials needed to complete the job.
4. Complete the job and have it evaluated.
5. Clean up the area and put the tools and supplies away.
6. Take the LAP test.

Principal Author(s): R. Arneson

CHECK LIST: ROOF SHEATHING

_____ Neat.

_____ Square.

_____ Measurements are accurate to ± 1/8".

_____ Procedures are accepted in the industry.

_____ Meets specifications listed.

70.01.04.07.A2-2

Student: ______________________ File Code: 70.01.04.08.A2-2

Date: ______________________ Date Published: 6-18-74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: GABLE STUDS/ROOF SHEATHING

70.01.04.07

1. One method of placing the first gable stud is to stand it upright and plumb it with a:

   a. steel measuring tape.
   b. T-square.
   c. framing square.
   d. level.

2. When studs are laid out from a centerline, they can be cut:

   a. in units of three.
   b. in pairs.
   c. in half.
   d. singularly.

3. A common term for an extended rake is a:

   a. rafter.
   b. slope.
   c. gable overhang.
   d. joist.

4. The gable end frame must be completed before completion of the roof:

   a. ridge.
   b. frame.
   c. rake.
   d. valley.

70.01.04.08

5. Before applying sheathing to a roof frame, a carpenter should check to see if all the members are:

   a. vertical.
   b. air tight.
   c. secure.
   d. moisture resistant.

70.01.04.08 (continued)

6. In relation to roof coverings, sheathing serves:

   a. no purpose.
   b. as a nailing base.
   c. as a moisture barrier.
   d. as a heat dissipator for the building.

7. One type of commonly used sheathing is:

   a. plywood.
   b. bevel boards.
   c. clasp boards.
   d. gypsum board.

8. If asphalt or other composition shingles are to be used for roof covering, the shiplap or common board sheathing must be:

   a. applied at every other joist.
   b. applied at random lengths.
   c. spaced evenly.
   d. applied solid.

9. Long boards are often used for sheathing in order to obtain:

   a. a better appearance.
   b. a lower cost.
   c. rigidity.
   d. greater flexibility.

10. Around chimney openings, sheathing should have a:

    a. 2" opening.
    b. flush fit.
    c. ½" opening.
    d. 3" opening.

LAP TEST ANSWER KEY: GABLE STUDS/ROOF SHEATHING

LAP 07

1. d
2. b
3. c
4. b

LAP 08

5. c
6. b
7. a
8. d
9. c
10. c

File Code: 70.01.04.09.A2-0

Date Published: 8-21-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student:

Date:

PERFORMANCE ACTIVITY: Felt Paper

OBJECTIVES:

Install felt paper according to specifications following procedures accepted in the industry.

Identify characteristics and purpose of felt paper.

EVALUATION PROCEDURE:

Installation meets the criteria listed on the attached checklist.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Stapler (Bostitch T-5 size)
Utility knife

PROCEDURE:

1. Read page 189 in Modern Carpentry.
2. Obtain specifications.
3. Obtain the tools, supplies, and materials needed to complete this job.
4. Complete the job and have it evaluated.
5. Clean up the area and put the tools and supplies away.
6. Take the LAP test.

Principal Author(s): R. Arneson

CHECKLIST: FELT PAPER

_________ Procedures are accepted in the industry.

_________ Meets specifications listed.

Student: ____________________ File Code: 70.01.04.09.A2-2

Date: ____________________ Date Published: 6-18-74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: FELT PAPER

1. One type of underlayment material used to cover roof decks is:

   a. cement.
   b. hot tar.
   c. felt paper.
   d. glass.

2. Felt paper is widely used to cover roof decks because it has a:

   a. low vapor resistance.
   b. low cost.
   c. easy applicability.
   d. good appearance.

3. Underlayment should only be applied when:

   a. the roof is dry.
   b. the temperature is under 80 degrees.
   c. necessary.
   d. the building codes require it.

4. Heavy felt paper should not be used as an underlayment because:

   a. it is too costly.
   b. it will not accept shingle nails.
   c. it has a messy appearance.
   d. moisture may build up.

5. What is usually installed at the overhang edge of roof sheathing?

   a. metal drip edge
   b. stud
   c. ridge
   d. head lap

6. The most common weight of saturated felt is:

   a. 6 lbs.
   b. 15 lbs.
   c. 4 lbs.
   d. 32 lbs.

7. The pound weight used in identifying roofing materials is the amount needed to cover a roof area of:

   a. 50 sq. ft.
   b. 100 sq. ft.
   c. 125 sq. ft.
   d. 150 sq. ft.

8. General standards for applying underlayment materials is for the toplap of all horizontal joints to:

   a. butt edges.
   b. be 7 inches long.
   c. be 2 inches in length.
   d. be 12 inches in length.

9. On each side of the centerline of hips and valleys, underlayment should be lapped at least:

   a. 10 inches.
   b. 12 inches.
   c. 14 inches.
   d. 6 inches.

10. On all side laps using an underlayment, the material should be lapped at least:

   a. 1 inch.
   b. 4 inches.
   c. 10 inches.
   d. 8 inches.

LAP TEST ANSWER KEY: FELT PAPER

1. c
2. a
3. a
4. d
5. a
6. b
7. b
8. c
9. d
10. b

File Code: 70.01.04.10.A2-0

Date Published: 8-21-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Interlock Shingles

OBJECTIVES:

Install interlock shingles according to manufacturer's specifications and procedures.

Identify characteristics of interlock shingles.

EVALUATION PROCEDURE:

Installation meets the criteria listed by the manufacturer.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP. This test is combined with the "Wood Shingles" LAP test and is taken after completing that LAP.

RESOURCES:

Modern Carpentry, Wagner.

Claw hammer (13 oz.)
Tinners shears (long handle)

PROCEDURE:

1. Read pages 205-208 in Modern Carpentry.

2. Obtain specifications.

3. Obtain the tools, supplies and materials needed to complete this job.

4 Note: The early part of the shingle installation is to have close supervision by the instructor. Be sure this is available as you apply the shingles.

4. Complete the interlock shingles installation.

5. Clean up the area and put the tools and supplies away.

6. Proceed to the next assigned LAP.

Principal Author(s): R. Arneson

File Code: 70.01.04.11.A2-0

Date Published: 8-21-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: __________

Date: __________

PERFORMANCE ACTIVITY: Wood Shingles

OBJECTIVES:

Install wood shingles according to manufacturer's specifications and procedures.

Identify characteristics of wood shingles.

EVALUATION PROCEDURE:

Installation meets the criteria listed in the manufacturer's specification and procedure sheet.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Shinglers hatchet
Tape measure (12 ft.)

PROCEDURE:

1. Read pages 198-199, 203-204 in Modern Carpentry.

2. Obtain specifications.
3. Obta [illegible] the to
3. Obtain the tools, supplies, and materials needed to complete this job.

   Note: The early part of the shingle installation is to have close supervision by the instructor. Be sure this is available as you apply the shingles.

4. Complete the job.

5. Put the tools, supplies, and materials away.

6. Take the LAP test.

Principal Author(s): R. Arneson

70.01.04.10.A2-2

Student: ____________________ File Code: 70.01.04.11.A2-2

Date: ____________________ Date Published: 6-18-74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: INTERLOCK SHINGLES/WOOD SHINGLES

70.01.04.10

1. How many times is a roof covered when using interlok shingles?

   a. four
   b. one
   c. two
   d. three

2. What is the approximate shipping weight per square of interlok shingles?

   a. 30 lbs.
   b. 75 lbs.
   c. 250 lbs.
   d. 400 lbs.

3. The main purpose of using interlok shingles is to provide protection from:

   a. hail.
   b. wind.
   c. sun.
   d. snow.

4. What should be installed at the point a shingle roof joins a vertical wall?

   a. rain gutter
   b. metal flashing
   c. metal drip edge
   d. special ridge shingles

70.01.04.11

5. A major disadvantage in using untreated wood shingles is their low resistance to:

   a. wind.
   b. hail.
   c. fire.
   d. dry rot.

70.01.04.11 (continued)

6. From which of the following trees are some wood shingles made?

   a. oak
   b. pine
   c. aspen
   d. cypress

7. Wood shingles are manufactured in random widths and in lengths of:

   a. 18, 24, and 30 inches.
   b. 12, 14, and 16 inches
   c. 8, 10, and 12 inches.
   d. 16, 18, and 24 inches.

8. Wood shingles are packaged in bundles capable of covering:

   a. 60 sq. ft.
   b. 100 sq. ft.
   c. 200 sq. ft.
   d. 150 sq. ft.

9. Which of the following nails is used for new roof construction?

   a. 4 d.
   b. 5 d.
   c. 6 d.
   d. 10 d.

10. Which of the following nails is used for overroof construction?

   a. 10 d.
   b. 3 d.
   c. 4 d.
   d. 5 d.

LAP TEST ANSWER KEY: INTERLOCK SHINGLES/WOOD SHINGLES

LAP 10

1. c
2. c
3. b
4. b

LAP 11

5. c
6. d
7. d
8. b
9. a
10. d

File Code: 70.01.04.12.A2-0

Date Published: 8-21-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: __________

Date: __________

PERFORMANCE ACTIVITY: Three-Tab Shingles

OBJECTIVES:

Install three-tab shingles according to manufacturer's specifications and procedures.

Identify characteristics of three-tab shingles.

EVALUATION PROCEDURE:

Installation meets the criteria listed in the manufacturer's specifications.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Modern Carpentry, Wagner.

Claw hammer (13 oz.)
Tape measure (12 ft.)
Tinners shears (long handle)

PROCEDURE:

1. Read pages 205-208 in Modern Carpentry.
2. Obtain specifications.
3. Obtain the tools, supplies and materials needed to complete this job.

   Note: Be sure the instructor is available to supply ongoing evaluation as shingles are applied.
4. Complete the job.
5. Clean up the area and put tools and supplies away.
6. Take the LAP test.

Principal Author(s): R. Arneson

Student: ____________________ File Code: 70.01.04.12.A2-2

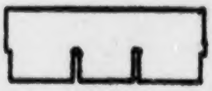
Date: ____________________ Date Published: 6-18-74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: THREE-TAB SHINGLES

1. What type of shingle is illustrated below?

   a. 3 tab hex strip
   b. individual lock-down
   c. giant individual American
   d. 3 tab square butt



2. The shipping weight per square of 3 tab shingles is:

   a. 300 - 350 lbs.
   b. 235 - 300 lbs.
   c. 150 - 200 lbs.
   d. 100 - 150 lbs.

3. The length of a 3 tab shingle is:

   a. 36".
   b. 24".
   c. 18".
   d. 40".

4. What is the width of a 3 tab shingle?

   a. 14"
   b. 10"
   c. 12"
   d. 16"

5. How many 3 tab shingles are found in a square?

   a. 60
   b. 80
   c. 40
   d. 100

6. What size nails should be used for nailing 3 tab shingles to new roofing?

   a. 1 3/4"
   b. 1 1/4"
   c. 2"
   d. 1"

7. To provide a smooth surface for applying asphalt shingles over wooden ones, a mechanic should first install:

   a. heavy tar paper.
   b. a backer board.
   c. a metal drip edge.
   d. starter strips.

8. What type of surface do asphalt shingles have?

   a. mineral granules
   b. smooth
   c. rubber
   d. corrugated

9. One reason to use starter strips is to:

   a. improve appearance.
   b. fill space between tabs.
   c. add labor time.
   d. provide a drip edge.

10. When installing various types of shingles, a mechanic should always:

   a. apply them as he feels is correct.
   b. study and follow manufacturers' specifications.
   c. study nearby structures and install accordingly.
   d. know what weather conditions exist in the area.

LAP TEST ANSWER KEY: THREE-TAB SHINGLES

1. d
2. b
3. a
4. c
5. b
6. b
7. b
8. a
9. b
10. b

File Code: 70.01.04.13.A2-0

Date Published: 8-21-75

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________

Date: ______________

PERFORMANCE ACTIVITY: Ordering Roof Section Materials

OBJECTIVE:

Order roof section materials which meet given specifications.

Identify size, quantity and type of materials required for a specific roof section.

EVALUATION PROCEDURE:

The materials ordered on the requisition are accurate to ± 1% of the specifications.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Blueprint Reading and Sketching, Carpentry Trades, Residential, Delmar Publishers.
Modern Carpentry, Wagner.

PROCEDURE:

1. Read pages 212-213 in Modern Carpentry.
2. Obtain specifications.
3. Estimate the materials needed and list them.
4. Hand in the materials list to the instructor for evaluation.
5. Take the LAP test.

Principal Author(s): R. Arneson

Student: ______________________ File Code: 70.01.04.13.A2-2

Date: ______________________ Date Published: 6-18-74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: ORDERING ROOF SECTION MATERIALS

The following eight questions refer to the Building Trades Blueprints for Carpenters

1. What size are the rafters in this structure?

   a. 2" x 6"
   b. 2" x 4"
   c. 2" x 8"
   d. 2" x 10"

2. The on center spacing of the rafters in this structure is:

   a. 16" O.C.
   b. 12" O.C.
   c. 24" O.C.
   d. 32" O.C.

3. What type of shingles are required on this structure?

   a. wood
   b. asphalt
   c. tile
   d. built-up

4. What type of roof is required by this plan?

   a. mansard
   b. gable
   c. gambrel
   d. hip

5. What is the length of overhang on this house?

   a. 4'
   b. 2'
   c. 3'
   d. 1'

6. In this structural plan, at what angle do the hip rafters run to the facia?

   a. 30 degrees
   b. 45 degrees
   c. 15 degrees
   d. 70 degrees

7. Where is a gable end found on this house?

   a. back
   b. front
   c. bedroom end
   d. garage end

8. What type of hip is found on this house?

   a. wood
   b. metal
   c. Boston
   d. fiberglass

9. If a house has a span of 24' and a length of 36' and a standard gable roof, how many roof rafters are required if they are placed 16" O.C.?

   a. 56
   b. 48
   c. 64
   d. 72

10. Given the same house dimensions as in question #9, but with a 2' overhang, what length of roof rafters is needed if the slope is 4/12?

    a. 12'
    b. 14'
    c. 18'
    d. 16'

LAP TEST ANSWER KEY: ORDERING ROOF SECTION MATERIALS

1. a
2. a
3. b
4. d
5. b
6. b
7. a
8. c
9. a
10. d

Student: ______________________________ File Code: 70.01.04.00.B2-2

Date: ______________________________ Date Published: 6-26-74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

UNIT POST TEST: ROOF

70.01.04.01 and 70.01.04.02

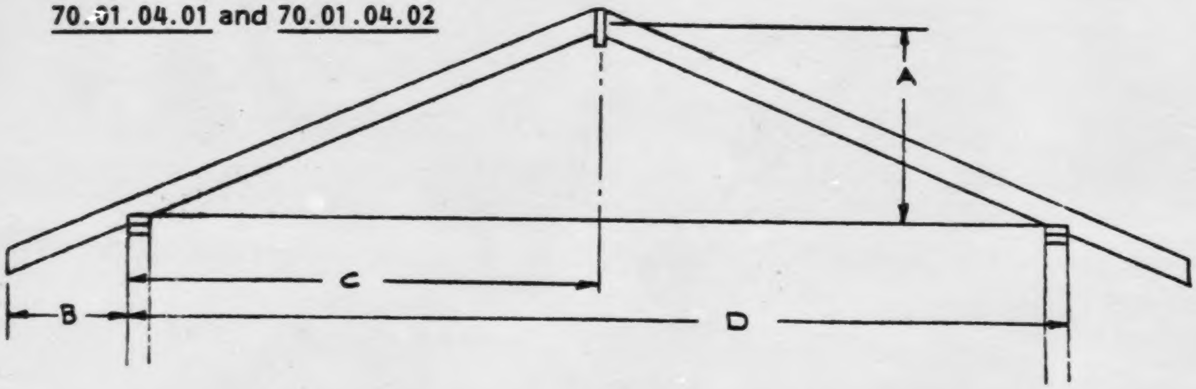


Fig. 1

1. Identify letter "D" in figure #1.

   a. plate
   b. run
   c. span
   d. rise

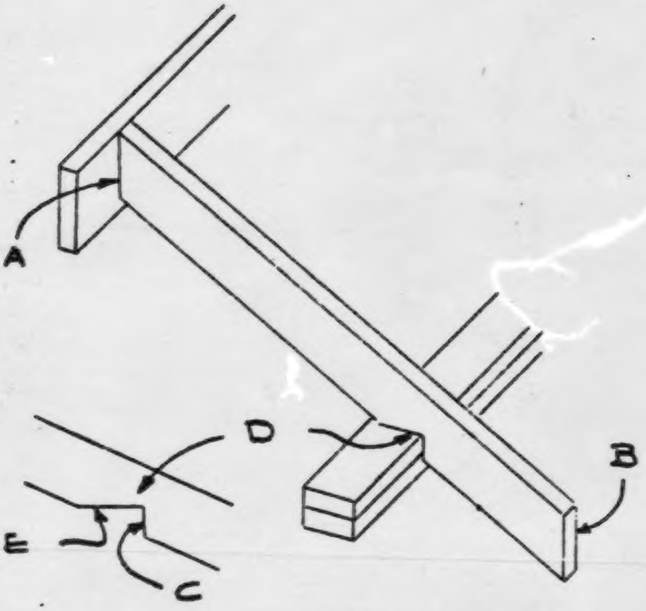


Fig. 2

70.01.04.01 and 70.01.04.02 (continued)

2. Using figure #2, identify cut "B".

   a. bird's-mouth
   b. tail
   c. plumb
   d. seat

3. Identify cut "C" in figure #2.

   a. plumb
   b. seat
   c. tail
   d. overhang

4. What type of rafter cut is depicted by letter "D" in figure #2?

   a. seat
   b. bird's-mouth
   c. tail
   d. plumb

5. A side cut can be used on which of the following rafters?

   a. cripple jack
   b. common
   c. valley
   d. overhang

70.01.04.03

6. In order to establish the plumb cut on a common rafter, the craftsman should use a:

   a. steel square.
   b. plumb bob.
   c. T-square.
   d. chalk line.

7. The angle cut used on the bottom of a rafter is a:

   a. seat cut.
   b. plumb cut.
   c. side cut.
   d. cheek cut.

70.01.04.03 (continued)

8. Which of the following terms indicates the incline of a roof as a ratio of the vertical rise to the span (twice the run)?

   a. slant
   b. angle of linearity
   c. slope
   d. pitch

9. The angle cut used on the top of a rafter is a:

   a. side cut.
   b. seat cut.
   c. plumb cut.
   d. cheek cut.

10. If the total roof rise is 4 feet and the total span is 24 feet, what is the pitch?

   a. 1/4
   b. 1/8
   c. 1/2
   d. 1/6

70.01.04.04

11. Common rafters are installed with the crown side:

   a. up.
   b. to the left.
   c. down.
   d. to the right.

12. What type of saw should be used for cutting a board parallel with the grain of the wood?

   a. rip saw
   b. cross-cut saw
   c. hack saw
   d. meat saw

13. When a rafter has an overhang, the overhang should be measured:

   a. horizontally from the wall line.
   b. along the rafter.
   c. vertically from the ground line.
   d. along any exposed portion.

70.01.04.04 (continued)

14. What type of saw should be used when cutting a board perpendicular to the grain of the wood?

    a. meat saw
    b. rip saw
    c. cross-cut saw
    d. hack saw

15. Which of the following items is used by an experienced carpenter to join rafters to the rafter plate?

    a. molly screws
    b. lag bolts only
    c. 12d nails only
    d. framing anchors

70.01.04.05

16. An item that must be considered when determining the ridge length of a hip roof is:

    a. valley length.
    b. the common rafters.
    c. twice the run.
    d. rafter stock.

17. Which of the following rafters can be used on a hip roof?

    a. soffit
    b. stud
    c. jack
    d. facia

18. On a plan view, the hip rafter will appear as a diagonal of a:

    a. rafter.
    b. rectangle.
    c. circle.
    d. square.

19. To layout a hip rafter, one should use the same procedure as required for a:

    a. joist.
    b. ridge.
    c. common rafter.
    d. plate.

70.01.04.05 (continued)

20. On a plan view, valley rafters will appear as a diagonal of a:

    a. square.
    b. rectangle.
    c. circle.
    d. building line.

70.01.04.06

21. A truss can be defined as:

    a. a framework that is designed to carry a load between two or more supports.
    b. a framed structure projecting above a sloping roof surface, and normally contains a vertical window unit.
    c. a relatively short beam supported by a wall on one end and a header on the other.
    d. the underside of the members of a building.

22. A top chord is the same as a:

    a. compression web.
    b. ceiling joist.
    c. tension web.
    d. roof rafter.

23. Which of the following materials should be used for installing truss rafters?

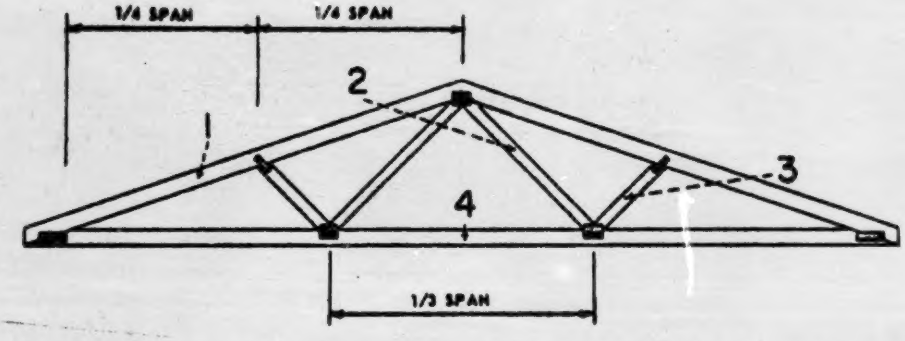
    a. glue and nails
    b. nails only
    c. glue only
    d. screws only

24. Which of the following best describes the purpose of a roof truss?

    a. purlin supports
    b. a frame that provides support for the wall studs
    c. a structural member that is supported by the ceiling joists
    d. a frame that carries the roof and ceiling surfaces

70.01.04.06 (continued)

The following one question refers to the illustration provided below.



25. What is the proper term for item #2?

    a. ceiling joist
    b. bottom chord
    c. top chord
    d. tension web

70.01.04.07

26. When installing gable studs, the first procedure is to square a line across the end wall plate below the gable:

    a. joist.
    b. rise.
    c. slope.
    d. center.

70.01.04.08

27. Covering material applied directly to a roof frame is known as:

    a. flashing.
    b. a gable.
    c. tar paper.
    d. sheathing.

28. Another purpose that roof sheathing serves is to:

    a. add weatherproofing.
    b. improve appearance.
    c. provide insulation.
    d. add rigidity.

70.01.04.08 (continued)

29. A craftsman should start installing roof sheathing at the:

    a. right side.
    b. peak.
    c. left side.
    d. lower edge.

30. When installing wood shingles, tile, or metal sheets, the sheathing may be spaced according to the:

    a. rise.
    b. span length.
    c. course arrangement.
    d. run.

70.01.04.09

31. Felt paper is generally sold by the:

    a. roll.
    b. 2' x 4' sheet.
    c. 4' x 8' sheet.
    d. pound.

32. Saturated felts, used under shingles, consists of dry felt impregnated with coal tar or:

    a. linseed oil.
    b. gravel.
    c. marble dust.
    d. asphalt.

33. The pound weight used in identifying roofing materials is the amount needed to cover a roof area of:

    a. 50 sq. ft.
    b. 100 sq. ft.
    c. 125 sq. ft.
    d. 150 sq. ft.

34. On each side of the centerline of hips and valleys, underlayment should be lapped at least:

    a. 10 inches.
    b. 12 inches.
    c. 14 inches.
    d. 6 inches.

70.01.04.09 (continued)

35. On all side laps using an underlayment, the material should be lapped at least:

    a. 1 inch.
    b. 4 inches.
    c. 10 inches.
    d. 8 inches.

70.01.04.10

36. When laying the first course of shingles, a mechanic must remember to lay it:

    a. upside down, face down.
    b. right side up, face up.
    c. right side down, face up.
    d. upside down, face up.

70.01.04.11

37. When the annular rings are perpendicular to the surface on a wood shingle, it is a:

    a. number 2 grade.
    b. number 1 grade.
    c. number 3 grade.
    d. number 4 grade.

38. When laying wood roof shingles, the expansion gap between each shingle should be:

    a. 3/8 inch.
    b. 1/2 inch.
    c. 1/8 inch.
    d. 1/4 inch.

39. What is the proper number of nails used to attach each wood shingle to the roof?

    a. three
    b. one
    c. two
    d. four

70.01.04.11 (continued)

40. From the outer edge of each shingle, nails should be placed at not more than:

    a. 1 inch.
    b. 3/4 inch.
    c. 1 1/2 inch.
    d. 1/4 inch.

70.01.04.12

41. The shipping weight per square of 3 tab shingles is:

    a. 300 - 350 lbs.
    b. 235 - 300 lbs.
    c. 150 - 200 lbs.
    d. 100 - 150 lbs.

42. What size nails should be used for nailing 3 tab shingles over an existing asphalt roof?

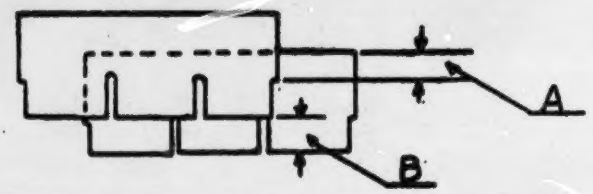
    a. 1 1/4"
    b. 2"
    c. 1 3/4"
    d. 2 1/4"

43. What type of surface do asphalt shingles have?

    a. mineral granules
    b. smooth
    c. rubber
    d. corrugated

44. What is area "A" called in the illustration provided?

    a. head lap
    b. side lap
    c. exposure
    d. concealed



45. Refer to the illustration in question #44. What is area "B" called?

    a. exposure
    b. head lap
    c. side lap
    d. single butt

70.01.04.13

The following four questions refer to the Building Trades Blueprints for Carpenters.

46. What size are the rafters in this structure?

    a. 2" x 6"
    b. 2" x 4"
    c. 2" x 8"
    d. 2" x 10"

47. The on center spacing of the rafters in this structure is:

    a. 16" O.C.
    b. 12" O.C.
    c. 24" O.C.
    d. 32" O.C.

48. In this structural plan, at what angle do the hip rafters run to the facia?

    a. 30 degrees
    b. 45 degrees
    c. 15 degrees
    d. 70 degrees

49. Where is a gable end found on this house?

    a. back
    b. front
    c. bedroom end
    d. garage end

50. How many square feet does a "square" of shingles cover?

    a. 100 sq. ft.
    b. 150 sq. ft.
    c. 120 sq. ft.
    d. 75 sq. ft.

UNIT POST TEST ANSWER KEY: ROOF

LAPS 01 & 02

1. c
2. b
3. a
4. b
5. c

LAP 03

6. a
7. b
8. d
9. c
10. d

LAP 04

11. d
12. a
13. a
14. c
15. d

LAP 05

16. c
17. c
18. d
19. c
20. a

LAP 06

21. a
22. d
23. a
24. d
25. d

LAP 07

26. d
27. d

LAP 08

28. d
29. d
30. c

LAP 09

31. a
32. d
33. b
34. d
35. b

LAP 10

36. a

LAP 11

37. b
38. d
39. c
40. b

LAP 12

41. b
42. c
43. a
44. a
45. a

LAP 13

46. a
47. a
48. b
49. a
50. a

Student: ____________ File Code: 70.01.04.00.A1-5

Date: ____________ Date Published: 11-12-74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Family Pay Number: ________ Sex: M F (Circle 1)

UNIT PERFORMANCE TEST: ROOF

OBJECTIVE:

Given a set of specifications, the student will be able to build a scale of truss and install a section of shingles to specifications.

TASK:

Given a set of specifications, construct a truss and install a section of shingles to specifications.

ASSIGNMENT:

RESOURCES:

(See attached sheet)

CONDITIONS:

The student will be given a set of blueprints and specifications. He will be required to scale down the blueprint dimensions, to the size indicated by the instructor. He will complete this activity, using tools, equipment, supplies and resource materials, commonly found in a carpenter shop. He will not be allowed to obtain assistance from the instructor or other students.

According to the circumstances inherent in the instructional setting, the student may be evaluated when completing the laps or he may be given another particular assignment, i.e., installing shingles.

RESOURCES:

Claw hammer
Tape measure
Framing Square
Chalk and plumb line
Level
Combination square
Hand saw
Flat rip bar
Power hand saw
Radial saw
Stapler
Utility knife
Phillips screwdriver
Assortment of fastners, shingles and lumber

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Student: ____________________ **File Code:** 70.01.04.00.A1-5

Date: ____________________ **Date Published:** 11-12-74

Family Pay Number: __________ Sex: M F (Circle 1)

PERFORMANCE CHECKLIST:

OVERALL PERFORMANCE: Satisfactory_____ Unsatisfactory_____

	CRITERION	
	Met	Not Met
Objective 1:		
1. Rafter is laid out and cut properly.		
Criterion: Rafter is cut to given pitch **and overhang** is correct. Rafter is cut to ± 1/8" to given pitch and overhang is correct.		
2. Truss is laid out according to given plan.		
Criterion: Members are installed according to engineering specifications.		
Modern Carpentry, W. H. Wagner, pp. 177-180.		
3, Gussets are installed properly.		
Criterion: Gussets are glued and nailed according to Engineering Specifications.		
Modern Carpentry, W. H. Wagner, pp. 177-180.		
4. Uses proper materials.		
Criterion: Materials meet specifications and FHA		

	CRITERION	
	Met	Not Met
standards.		
5. Uses tools and equipment safely.		
Criterion: No injuries to student or damage to tools occurs.		
OSHA Standards are followed.		
6. Student completes job in allotted time.		
Criterion: Allotted time: four hours.		
7. **Paper is properly installed.**		
Criterion: Modern Carpentry, pp. 185-213.		
8. Shingles are properly trimed at outside edge of roof.		
Criterion: Line of shingles is straight to 1/8".		
9. Shingles form a straight line vertically and horizontally.		
Criterion: To ± 1/8" form a straight line.		
10. Shingle spacing is proper.		
Criterion: To manufacturers specifications.		
11. **Shingles are properly fastened.**		
Criterion: Manufacturers specifications.		
12. Test completed in specified time limits.		
Criterion: As per assignment.		
To obtain an overall score of satisfactory student must meet		
criterion on 10/12 line items.		